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THE ORIGIN OF MAPLE SUGAR

by

James F. Pendergast

No. 36 **1982**

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Syllogeus series No. 36
(c) National Museums of Canada 1982
Printed in Canada

Série Syllogeus n°36
(c) Musées nationaux du Canada 1982
Imprimé au Canada

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Syllogeus No. 36

National Museums of Canada
National Museum of Natural Sciences

Les Musées nationaux du Canada
Musée national des sciences naturelles

Ottawa 1982

Plate 1: Lafitau's 1724 illustration (Plate 7, vol. 2) showing Indians drawing and boiling sap and making maple sugar cakes.

Fenton & Moore edition Lafitau 1724, Champlain Society 1977.

TABLE OF CONTENTS

	page
Abstract	5
Résumé	6
Part 1 - Hypothesis	8
Background	8
Introduction	8
Thevet's Text	9
Thevet's Reputation	11
Thevet's Access to Cartier	11
Cartier-originated Thevet Texts	12
Value of Thevet's Work	12
Title and Rank	13
The 'Jacques Cartier' Conclusion	13
Discussion	14
First Opinions	14
First Contradictions	16
The Cartier Incident - Time and Place	18
The Cartier Incident - Prehistoric Associations	19
Earliest Sap Harvests	20
Discovery Not Dependant on European Vessels	21
Scholars Not Supporting Aboriginality	22
Scholars Supporting Aboriginality	24
Conclusion	25
Part 2 - Sources	28
Ethnological References	28
Early Chroniclers	33
Later References	41
Treatises	43
Sources for Sap	48
Wide Distribution	49
Indian Captives	51
Maples in Europe	52

page

Part 3 - Summary 55

Acknowledgements 56

Bibliography 63

Plates

1. Lafitau's illustration of the Indian maple sugar industry 2
2. Orr's greatly modified copy of Lafitau's illustration 7

Figures

1. Distribution of the Sugar Maple (Acer saccharum Marsh.) 57
2. Distribution of the Red Maple (Acer rubrum L.) 58
3. Distribution of the Black Walnut (Juglans nigra L.) 59
4. Distribution of the American Sycamore (Platanus occidentalis L.) 60
5. Distribution of the Black Cherry (Prunus serotina Ehrh.) 61
6. Distribution of the American Beech (Fagus grandifolia Ehrh.) 62

ABSTRACT

It is postulated that the maple industry was discovered or invented by the Indians in northeast North America before the arrival of the Europeans. Essentially this conclusion is premised on documentation orginating prior to mid-18th Century. Thereafter the number of references concerning maple products increase sharply, although few of these are germane to a work seeking to discern the origin of the industry. Nevertheless, many of these later references are examined for the information they contain regarding Indian techniques and to avoid leaving the impression that they have been overlooked.

The earliest reference is a text published by Thevet in 1557 and again in 1558 which describes the accumulation of a considerable quantity of sap in the Canada region. Close scrutiny of this passage leads to the conclusion that it describes an incident experienced by Jacques Cartier in the spring of 1536 or 1542. An examination of the 17th Century options regarding the origin of maple sugar, which without exception support Indian origins, and the first contrary opinion, that expressed by Charlevoix in 1744, results in a conclusion favouring the earliest chroniclers.

The reasons commonly used in support of European origins are examined in detail including the lack of suitable vessels for boiling, the miniscule quantities of sap observed by the earliest observers in Huronia and Acadia, and the likelihood that European techniques were introduced by the French during the period 1664-1685. Hypotheses presented by scholars who since 1751 have supported aboriginal origins are contrasted and compared with the works of those who do not favour aboriginality commencing with Charlevoix. Short digests of the treatises which seek to provide a definitive answer to this problem are included commencing with Morgan's work published in 1851 through to Henning's 1965 thesis.

RÉSUMÉ

L'industrie érablière serait apparue chez les Indiens du nord-est de l'Amérique du Nord avant l'arrivée des Européens. Cette conclusion se fonde essentiellement sur des documents antérieurs au milieu du XVIII^{e} siècle. Par la suite, le nombre d'allusions aux produits de l'érable grandit soudain, mais elles n'aident généralement pas à retracer l'origine de cette industrie. Néanmoins, l'auteur examine ces allusions tardives pour en retirer l'information qu'elles contiennent sur les techniques des Indiens et pour montrer qu'il ne les a pas négligées.

La plus ancienne allusion se trouve dans un texte publié par Thévet en 1557 puis en 1558, où il décrit l'accumulation d'une quantité considérable de sève au Canada. A examiner ce passage de près, il s'agirait d'un incident arrivé à Jacques Cartier au printemps de 1536 ou de 1542. L'examen des opinions exprimées au XVII^{e} siècle sur l'origine du sucre d'érable, qui toutes sans exception étayent la thèse des origines indiennes, et de la première opinion contraire, émise par Charlevoix en 1744, aboutit à la conclusion que les premiers chroniqueurs avaient raison.

L'auteur examine en détail les raisons communément avancées pour attribuer à l'Europe la genèse de l'industrie érablière : manque de récipients propres à bouillir, quantités minuscules de sève observées par les premiers témoins en Huronie et en Acadie et probabilité que ce sont les Français qui ont introduit les techniques européennes entre 1664 et 1685.

L'auteur oppose et compare les hypothèses avancées par les érudits qui, depuis 1751, attribuent l'industrie érablière aux Indiens et les travaux des tenants d'une origine européenne à commencer par Charlevoix. L'ouvrage contient de brefs résumés des différentes études qui cherchent à répondre une fois pour toutes à ce problème, depuis celle de Morgan, publiée en 1851, jusqu'à la thèse de Henning en 1965.

Plate 2: Orr's much altered reproduction of Lafitau's illustration.

Ontario Annual Archaeological Report, 1915.

THE ORIGIN OF MAPLE SUGAR

PART 1 - HYPOTHESIS

BACKGROUND

Introduction

This paper originated in the polemic which arose some years ago when it was suggested, among other possibilities, that a small St. Lawrence Iroquoian archaeological site in eastern Ontario may have been a prehistoric maple sugar camp (Pendergast 1974). Generally anthropologists are not convinced that the Indians originated the maple industry although most are aware of early references describing their use of sap in Huronia, Acadia and Gaspesia. They believe that the Indians learned from the Europeans how to boil sap to make sugar and that this was not possible until metal vessels were introduced by the Europeans. The general public, on the other hand, believes that the Europeans learned from the Indians how to boil sap to make sugar. This is the viewpoint frequently found in the popular press and local histories, although seldom does either refer to the earliest references, preferring to quote the experiences of the local settlers which usually date from the late 18th or 19th Century.

Having become involved in a discussion whose limits are far broader than was believed possible when the simple possibility of prehistoric origins was first raised in 1973, there was a compulsion to compile a definitive body of data which, hopefully, would confirm or deny one or the other of the widely divergent opinions generally held.

By 1974 sufficient data had been accumulated to prepare a preliminary paper which was read to members of the Ottawa Chapter of the Ontario Archaeological Society. Later in 1977 a revised and more comprehensive paper was read to the archaeologists, ethnologists and ethnohnistorians meeting at the Iroquois Conference in Rensselaerville, New York. Scholars attending both these meetings made suggestions and brought to light additional references which further modified the paper to good advantage. By 1978 the paper was believed to be sufficiently definitive to warrant its being read at the Annual Meeting of the Canadian Archaeological Association which met in Quebec City in April of that year.

However definitive that paper may have been, it was not possible to present specific evidence in support of the manufacture of sugar by the Indians much earlier than 1676 when LeClercq, writing of his experience in the Gaspe region, provides the first eye-witness account of the manufacture of maple sugar. The Honorable Robert Boyle (1772, 2:111) had made mention of it earlier in his 1663 essay relying on information received as early as 1660 or 1661 from New

England, but he made no suggestion as to its origin. As a result it was necessary to premise the case for prehistoric origins upon the earliest recorded use of sap as described by Lescarbot in 1607 (Lescarbot, 1618, 3:194), by Sagard in 1624 (Sagard, 1632, p.99) and LeJeune prior to 1634 (Thwaites J.R. 6:273) stressing the likelihood that the use of sap could not long have preceded the discovery of syrup and sugar whether due to natural evaporation or as result of boiling accidentally or by design.

A serious weakness in this hypothesis lay in the miniscule quantities of sap described by these observers. The sap sucked from trees in the vicinity of Port-Royal as observed by Lescarbot, or the sap Sagard saw sucked from twigs in Huronia, or the sap obtained from eating wood-chips in Gaspesia as seen by LeJeune would be unlikely to result in an accumulation which could be reduced to syrup or sugar.

Thevet's Text

There the matter rested until late in the summer of 1979 when the opportunity arose to examine in the Rare Book Room, National Library of Canada, Thevet's 'Les Singularitez de la France antarctique autrement nommée Amérique' first published in 1557. This is not an obsure reference but, aside from Seguin (1975, p.27), the Thevet text germane to the origin of maple sugar has not been used by one of the many scholars whose works are quoted in this paper. It is not included in the most comprehensive works on the maple industry. Morgan (1851), Henshaw (1890), Chamberlain (1891), Barbeau (1946), Nearing (1950) and Henning (1965) do not include it in their treatises. Schuette and Schuette (1935), Flannery (1939) and Schuette and Idhe (1946) do not include it in their authoritative bibliographic works.

Briefly, Thevet's text (1557, p.158) describes how before 1557 a French expedition consisting of the "the Captain and other gentlemen of his company", having learned how to collect sap, collected four or five large pots in an hour which they found to be as good as the good wine of Orleans or Beaune. The complete text is set out in Part 2 of this paper, page 33.

Seguin (ibid) refers to it, using the wrong pagination, as follows: "One day, when an Indian decided to cut a tree, according to Thevet about 1557, there 'gushed out from it a juice, which was found to taste as good and as delicious, as the fine wine of Orleans or Beaune..." (Thevet's text in italics). He does not quote the complete text nor does he seek to learn its significance. This abbreviated reference was included in the paper read in Quebec City in 1978 with particular emphasis on the early date but without further elaboration. As is sometimes the case with a reference taken from a

secondary source, the full import of the text was not appreciated until the original was studied in detail.

To obtain full value from the Thevet text it is necessary to know the identity of 'the Captain'.

Thevet's 'Singularitez' describes many lands. Commencing with Chapter 75, which is entitled "De la terre de Canada, dicte par cy devant Baccalos decouverte de notre temps & de la manniere de viure des habitants", he describes the Canada region. In that Chapter and in Chapter 76 he makes it clear that the information he sets out is derived from "Jacques Cartier, Breton, master pilot and Captain" (ibid. p.149). Later he refers to him as "Captain Cartier" (ibid. p.150) and simply "Cartier" (ibid. p.151 verso). In chapter 80, in the text set out in Part 2 of this paper, he is simply called "the Captain" (ibid. p.158). The inclusion of "Donacona" (ibid. p.152) and the "fleuve d'Ochelagua" and the "Saguene" (bid. p.156 verso) too have a Cartier context.

There are other instances where Cartier is simply referred to in the third person as "the Captain". In the account of his 'second' voyage he is constantly and respectfully called "the Captain" (Biggar 1924, pp.92, 108, 126, 137, 148, 162, 164, 166, 174, 189, 191, 206, 209, 214, 218, 224, 233). Biggar has noted this style and remarked upon it in his 'Early Trading Companies of New France' (Biggar 1901, p.213). In the same account of Cartier's 'second' voyage he and his party are known collectively as "the Captain and all the gentlemen" (Biggar 1924, p.141) and "the Captain and the gentlemen" (ibid. p.152).

It seems clear that "the Captain and the other gentlemen of his company" referred to in the Thevet text under examination (1557, p.158) is Jacques Cartier and his party.

This conclusion requires scrutiny before it can be accepted as a basic tenet on which to premise further discussion. The reasons for Thevet's poor reputation as a scholar should be examined and their applicability to this text must be assessed. Evidence should be produced to show that Thevet had access to information known only to Cartier which could account for this unique text. Were it possible to demonstrate instances where Thevet has written on other matters which could only have originated with Cartier credibility would be enhanced. If it could be shown that recognized scholars have upheld Thevet's work in fields unrelated to this paper his work in this regard would gain stature. If among those called 'Captain' who visited Canada region prior to 1557, Cartier best fits the evidence his candidature for the role of Captain in Thevet's text would be enhanced. Were all of these matters to be demonstrated there would be good reason to believe Jacques Cartier and 'the Captain' in Thevet's text are one and the same person.

Thevet's Reputation

Biggar (1901, pp.231-242) provides a comprehensive evaluation of Thevet's work which quickly comes to the core of the reason why Thevet's work has acquired a bad reputation in some circles. "With the exception of a few facts about snowshoes, hunting and the medicinal preparations (Thevet 1557, pp.151 verso, 151, 152 verso) he tells us absolutely nothing new" (ibid.p.233); "his information is all second hand" (ibid.) and "Although he had never been near Newfoundland he added a chapter upon it based on accounts given him by fishermen. Thus the information about these regions is not first hand but came to him from books or persons who had been there. Later on, however, as we shall see, he declares that it was all first hand" (ibid. p.234). Drawing attention to the contempt in which his contemporaries held him for having claimed for himself the experiences of others (L'Estoile 1878, 5:61, 62; 4:381 and De Thou 1734, 2:651) Biggar concludes "Thevet's work is of very slight value" (ibid. p.239). Hoffman (1961, p.172) explains that it is principally because he "wrote in a large part from secondary sources" and because "in his later works he invented some incidents; and that he gave himself credit for some explorations not actually accomplished" that Thevet's work has come into ill repute. In the context of this work Thevet does not claim to be involved in the sap collecting incident he describes. He makes it quite clear that he is recounting an incident experienced by "the Captain and other gentlemen of his company".

Thevet's Access to Cartier

Certainly Thevet was in a position to obtain information directly from Cartier. A document in the Bibliothèque National (Ms. Fr. 15452 fol. 157 and Cf fol. 151) confirms Thevet's assertion (1575, 2:1014b) that Cartier was his "grand et singulier amy" with whom, on one occasion, he spent nine days in his home at St. Malo en l'Isle. Biggar (1901, p.234) accepts this association without question. Hoffman (1961, p.172) states that by 1550 Thevet "had already interviewed Cartier" as had Rabelais (ibid. p.152). Trudel in his work on Cartier in the 'Dictionary of Canadian Biography' (1966, 1:170) remarks that Cartier "received the Franciscan André Thevet to whom he gave extensive information about Canada". Thevet's text on sap could have originated in his liaison with Cartier and not have been recorded elsewhere.

Cartier - originated Thevet Texts

There are instances in which scholars in other fields have indicated that some Thevet texts could only have originated with Cartier. Biggar (1901, p.235) states that Thevet "only saw what Cartier and others had already seen and described" and that whatever "extra information" there is in 'Singularitez' can only have come from Jean Alfonse (Biggar 1901, pp.222-226) "and from Cartier himself" (ibid. pp.233-235). Having assured us that, with certain specified exceptions, Thevet "tells us absolutely nothing new" (op. cit.) Biggar (ibid. p.240) concedes that there is only "one story of Cartier's visit which is new and which he perhaps heard from Cartier himself". Biggar appears to have overlooked the unique nature of the sap text in his assurance that Thevet "tells us absolutely nothing new". Hoffman (ibid. p.173) referring to the Indian names for Tadoussac, Anticosti and Miramichi, states that "We know of no source through which Thevet may have obtained these names except from Cartier".

Value of Thevet's Work

A number of scholars have upheld the value of Thevet's work. Lescarbot drew upon it (Biggar 1901, p.255). Biggar himself quotes Thevet without reservation upon occasion (ibid. pp.23, 31, 33). Ganong (1936, p.109-129) and Hoffman (1961, pp.171-179) have shown that his information is valuable and "within the particular field we are now considering (cartography) he is extremely important" (ibid. p.172). Hoffman (ibid. p.173) explains that Thevet provides the first record of the Indian names in the Gulf of St. Lawrence and remarks that however he may have obtained the information "they give undeniable proof of the authenticity of Thevet's sources for Canada". The Canada region at that time encompassed the land adjacent to the St Lawrence River between Coudres Island (Grosse Isle) on the east and a point between Stadaconna (Quebec) and Trois Rivieres on the west. La Roque de Roquebrune quotes from Thevet in a thoroughly complimentary manner in his works in the 'Dictionary of Canadian Biography'. He states (1966, 1:424) that "Thevet gives us valuable information about him (Roberval) and his colony" and, regarding events connected with the Ile des Demons and Marguerite de La Roque, that "Thevet is much more precise" and that "Thevet's narrative (has) an authenticity which confirms and supplements" other accounts (ibid. 1:425-426). Hoffman (1961, p.172) cogently observes that Thevet's poor reputation is "in a large measure....the result of careless, hasty and biased scholarship on the part of

various students". There is good resaon to temper any inclination to discard the sap text simply because it is found in Thevet's work.

Title and Rank

Prior to 1557 when Thevet's text has "the Captain and other gentlemen of his company" collecting large amounts of sap in the Canada region there are records of three explorers being in that region; Cartier (Biggar 1924), Roberval (ibid.) and Alfonse (Fonteneau) (Lanctot 1966, p.309). Although Verrazano, Rut, Crignon, Parmentier and Hore made voyages to the New World during that period they did not visit the Canada region. The voyages to the Canada region described by Carlisle occur later in 1581.

It has been noted that in the accounts of Cartier's voyages (Biggar 1924) and in Thevet's "Singularitez" (1557, pp.149-158) Cartier is consistently referred to as "the Captain". His nephew Jacques Noel refers to him as "Captain Cartier" in a letter dated 1587 (Biggar 1924, p.314) as does Thevet (ibid. p.150).

Roberval on the other hand is referred to as "our General", "the General", "the Kings Lieutenant General", "Monsieur Roberval" (ibid.pp.264-270) and "Lieutenant General in Canada" (La Roque 1966, p.423). Thevet upon occasion refers to him as "Captain Roberval".

Alfonse (Fonteneau) sailed with Roberval in 1542 commissioned as "captain and pilot of King Francis I"(Lanctot 1966, p.309). Other authorities have him the "pilot" (Biggar 1901, p.233), "navigator and pilot" (Hoffman 1961, p.168) and Hakluyt has him "chief Pilot". In 1544 when "La Cosmographie avec l'espère et régime du soleil et du nord par Jean Fonteneau dit Alfonse de Saintonge, Capitaine-pilote de Francois Ier etc." appeared and in 1559 when "Les Voyages avantureux du Capitaine Ian Alfonse Saintongeois" appeared his titles are clear.

Cartier, Roberval or Alfonse were all known as 'Captain' but Thevet makes it clear (1557, pp.149, 150, 151 verso) that his information concerns Cartier.

The "Jacques Cartier' Conclusion

There is good reason to accept the veracity of Thevet's text and to attribute the experience to Jacques Cartier. Although Cartier, Roberval and Alfonse all visited the Canada region during the period prior to 1557, and all were known as Captain, Thevet is clear that he is recounting Cartier's experiences. Possibly Thevet met with Roberval and Alfonse and learned of

their voyages first hand but it is certain that he met with Cartier. Aside from his account of Roberval's colony, Thevet's works do not have the same close relationship with Roberval as they do with Cartier. Biggar (1901, p.239) notes that Thevet's 'Cosmographie' regarding the "Route and Dangers of Canada" (159 verso) is a copy of Alfonse's 'Cosmographie'. Scrutiny of Alfonse's work shows clearly that Thevet's references to Canada in 'Singularitez' are not found in Alfonse's 'Cosmographie". All evidence indicates that Thevet's text on sap recounts an incident experienced by Jacques Cartier.

However this thesis is not contingent upon the incident described by Thevet being attributed to Jacques Cartier. In the remote event that it was Roberval or Alfonse who experienced the incident the date would be confined to the spring of 1543. Whether the event took place in the spring of 1536 or the spring of 1542 with Cartier present, or in the spring of 1543 with Roberval or Alfonse present, would not significantly alter the hypothesis.

Nevertheless, the evidence favours Jacques Cartier.

DISCUSSION

First Opinions

Aside from Thevet the earliest chroniclers of the maple industry leave no doubt as to its origin by the Indians. Their observations pre-date the first dissenters by almost 100 years.

As early as 1660 or 1661 the Honourable Robert Boyle(1772, 1:lxix) described in a paper "Essay IV. Presenting some things relating to the Hygieinal part of Physick" how in Brazil trees were tapped for sap which when boiled became sweeter and thicker (ibid. 2:111). Sometime after writing these lines and prior to 1663 when his work was published he recounts how he was visited by " ... an ancient virtuoso, governor to a considerable colony in the northern America, and inquiring of him, among other particularities touching his country, something in relation to the thoughts I had about making several kinds of sugar; he assured me, upon his own experience, that there is in some parts of New England a kind of tree..." whose sap was boiled to make sugar. Boyle does not seem to be aware of this process being practiced in "northern America" although he was familiar with the technique in Brazil which he had described earlier. Boyle seeks to introduce credibility into his account regarding the practice in New England by reassuring his reader that it was not until the Governor confirmed to him saying that "he assured me upon his own experience" that Boyle was prepared to recount the information.

But Boyle must have harboured doubts for he sought confirmation. Later (ibid) he states " ... and the like was confirmed to me, upon his own knowledge, by the agent of the great and populous colony of Massachusets" (sic).

Although Boyle's work does not attribute sugar made from tree sap to the Indians it does establish that prior to 1660 or 1661 the process was established in New England. Seemingly it was well known among those who lived there but had not yet been heard of widely in England even in botanical circles. Otherwise it is unlikely to have escaped Boyle who, as a result of his work on sugars, was aware of a similar process as far afield as Brazil. This is further evidence of the random and unexpected pattern which still characterized early knowledge of the industry, the discrepancies between observations by Cartier, Champlain and Sagard being an earlier example. The randomness of this information among those who might be expected to be knowledgeable tends to negate the validity of arguments against the existence of the maple industry, once it has been observed, simply because a later observer makes no mention of it. Some, like Cartier, having observed it, did not include it in their relations for whatever reason.

Some sixteen years later LeClercq provides the first eye-witness account of the manufacture of maple sugar which may date from as early as the spring of 1676 when he first went among the Indians of Gaspé (Dumas 1966, p.438). He concludes his account saying, "It is formed into little loaves which are sent to France as a curiosity..." (LeClercq, 1691, pp.122-123). Had sugar made from boiled tree sap been known to the French it is unlikely that he would have sent it back to France as a curiosity.

In 1684 Dr. Robinson explained that the maple sugar he sent to Mr. Ray was "sent from Canada where the natives prepare it from the said juice; ... The Indians have practiced it time out of mind, the French begin now to refine it, and turn it to advantage" (Robinson 1798, p.322). 'Mr. Ray' was John Ray, botanist and author of the authoritative 'Historia Plantarum'. The fact that Ray, a specialist in botany, does not dispute Dr. Robinson's remarks regarding either the antiquity of the process or its origin by the Indians is significant. Indeed the sugar is of sufficient interest to Ray to have him enlist another member of the intellectual community with an interest in botany, the "ingenious apothecary" Dr. Martin Lister (Edlin pers. comm.), in an experiment to produce sugar from the sap of the English "greater maple" (Acer pseudoplatanus L.)

In 1685 all members of the Royal Society, London, were advised of this experiment when a short account, presumably written by the Secretary, Mr. Aston, was published in the Society's 'Philosophical Transactions for 1684-85'. It states, in part "The savages of Canada" produce maple sugar and that "The savages here have practiced the art longer than any living among them can remember" (Aston, 1686, 25:988). There being no record of these accounts being refuted, it is suggested that by their acquiescence members of the Royal

Society, who might reasonably be expected to be familiar with the natural products of Europe and furter afield, have expressed support for the views expressed by Dr. Robinson on the antiquity and origin of maple sugar.

In 1688 Ray, in his monumental early work 'Historia Plantarum" (1688, 2:1701), noted that the Indians in Canada make sugar from tree sap. Ray made this same comment in 'Philosophical Letters" (1718, pp.177, 179, 180) without elaboration. Bearing in mind that Ray had travelled widely in Europe during the period 1663-1666, including the Low Countries, Germany, Switzerland, Italy, Malta and France, studying natural history, particularly botany, and had collected plants in those countries (Henrey 1975, 1:127-134) it is unlikely that he would reply to Dr. Robinson in 1684 that the maple sugar from Canada was "a thing to me strange and before unheard of" had he known of it in Europe. It seems unlikely that given Ray's interest in botany he would have overlooked what to him would have been so novel. Tree sap was not made into sugar in Europe at that time.

Rale in his memoirs (1726) commencing in 1693 remarks how curious it is that the production of bayberry wax and maple sugar, both articles of considerable importance in the New World, had been learned from the Indians.

First Contradictions

Charlevoix (1744, 5:179-181) writing upwards of sixty years later, is the first to contradict the early chroniclers of maple sugar. Following his visit to the Abenaki village on the St. Francis River in 1721 where he was "regaled with the juice of the maple" he explained, "It is very probable the Indians who are perfectly well acquainted with all the virtues of their plants, have at all times, as well as this day, made constant use of this liquor. But <u>it is certain</u>, they were ignorant of the art of making sugar from it which we have since learned them". Later (ibid. 6:47) he remarks, "The nations of the south had only vessels of baked earth to dress their meat. In the north they used vessels of wood and they made water boil by throwing in some stones made red hot. They found our iron and tin kettles much more convenient ...".

These two opinions expressed by Charlevoix are the genesis of the widely held belief that the French taught the Indians to make sugar and that they were not able to do so until European metal kettles became available. Some may not be aware that Charlevoix contradicts the earliest observers but few are unaware of Morgan's views (1901) which closely parallel Charlevoix's thesis.

Morgan states, "Our Indian population have long been in the habit of manufacturing sugar from the maple" (1901, 1:186). He ponders, "Whether they learned the art from us or we from them may be a difficult question" and, significantly avoiding Charlevoix's certainty, he allows that "the former would

seem to be more probable from the want of suitable vessels among them for boiling" (ibid. 1:87, note 1).

That Charlevoix's certain, but unsupported pronouncement regarding aboriginality contradicts earlier reputable observers, seems to have been overlooked by some later scholars. Possibly his contradiction has been overshadowed by the difficulties he perceived in aboriginal boiling techniques which he deemed sufficient to make the production of sugar unlikely until European vessels were introduced. Then it would be that "They found our iron and tin vessels more convenient"; presumably more convenient than native vessels. This comparison infers that native vessels were used for that purpose, however inconvenient they may have been, before the European vessels were available, for only then could there be a comparison on the basis of their convenience. The convenience of the European item can hardly be doubted but the relative convenience of the European and Indian boiling technologies can not be used to deny the Indians the ability to boil in their vessels. But this has been suggested; "In no instance were the Indians using native utensils for boiling but instead the iron and brass kettles of European origin" (Henning 1965, p. 35). Ganong (LeClercq, 1691, p. 123) too opines that boiling using aboriginal techniques would "not only (be) too trying for aboriginal industry but one rather unlikely to have been hit upon by any known aboriginal housekeeping arrangements".

Aside from the scale of production possible after European kettles were introduced, and quantitative considerations are not germane to this paper on origins, there can be no question that the Indians boiled in their wooden, bark and earthenware vessels before the European vessels became available. Champlain (Biggar 1929, 3:126-127) describes how during his stay with the Huron during 1615-1616 they put ground corn " ... into an earthen pot full of water, boil it, stirring it from time to time lest it burn or stick to the pot ..." and again "a quantity of fish and meat which they cut into pieces, then put it into large kettles filled with water letting it boil well ... stirring it constantly" (ibid. 3:128). Sagard describing his observations in 1623-1624 states that "Before the arrival of the French in the country the Canadian and other nomad tribes" cooked in wooden and bark vessels using hot stones. "But the Huron and other sendentary tribes and nations used ... earthenware pots ... These are very good and do not break when set on the fire even though they may not have water in them" (Sagard, 1632, pp. 108-109). He also explains how "they boil it (corn) in their pots or kettle which they call 'Anoo'" (ibid. p. 106). In addition to this ethnohistoric evidence there is a large accumulation of prehistoric Iroquois and Algonkian earthenware potsherds on which there are the carbonized remains of foods that have been boiled in the vessel. Sometimes these potsherds show the signs of liquids having boiled over or spilled to stain the exterior of the vessel.

Clearly there is reputable and earlier evidence which contradicts Charlevoix's certain comment regarding the origin of the maple sugar industry. There is also a considerable body of evidence which shows with certainty that the Indians were able to boil in their wooden, bark and earthenware vessels before European vessels were introduced, however more convenient and productive the European item may have been. That being the case it is suggested that neither Charlevoix's certainty nor Morgan's probability in this regard should be allowed to overwhelm other evidence regarding the origin of the maple sugar industry. Reservations regarding the quantity or the quality of the sugar produced by the Indians in their native vessels should not be allowed to cloud the issue of origin.

The suggestion that Charlevoix erred in his certain pronouncement regarding the origin of maple sugar is not the first instance that Charlevoix has been questioned. LaRoche (1966, p. 424) states that Charlevoix erred in claiming that Roberval made a second voyage to America, erred in claiming that Roberval was drowned in a shipwreck in 1549, erred in naming Roberval's brother 'Pierre' rather than 'Jean' and that Roberval could not have been drowned with Jean in a shipwreck because Jean "did not sail the seas for he was a monk and prior of his order in Normandy". Having erred on these more readily verifiable matters possibly he erred too in contradicting the earliest chroniclers regarding the origin of maple sugar.

The Cartier Incident - Time and Place

Thevet clearly states that the incident he describes took place where the "Canadians" have developed a taste for tree sap. As has been noted Cartier's 'Canada' consisted of the region along the St. Lawrence River bounded on the east by Coudres Island, present day Grosse Isle, and on the east by a point between the St Lawrence Iroquoian Village of Stadacona and Trois Riviers (Biggar 1924, pp. 119, 142, 172 and note 69 p. 103). Cartier also referred to Stadacona as 'Canada" (ibid. p. 175 and note 9). In seeking to establish a date for Cartier's experience he must be in the Canada region during the spring when the maple industry would be operating. Both his 1524 (Thwaites J.R. 3:41, Lanctot 1944, pp. 233-245; Hoffman 1961, pp. 113-113) and his 1534 (Biggar 1924, pp. 3-81) voyages fail to meet these criteria. On neither of these did Cartier enter the Canada region. On the other hand he was in Canada during the spring of 1536 during his second voyage commissioned by Francis I (Biggar 1924, p. 210) and during the spring of 1542 during his 'third' voyage with the Roberval expedition (ibid, p. 264). Cartier may have made a fifth voyage in 1543 to bring home Roberval but "no account of any sort has been preserved" (Biggar 1901, p. 219; LaRoque 1966, p. 424).

The spring of 1536 and the spring of 1542 emerge as the likely dates when Cartier encountered the incident described by Thevet and it took place in the Canada region, where to this day the maple industry thrives. If the incident was attributed to either of the other two 'Captains' who were in the Canada during that period, Roberval and Alfonse, the spring of 1543 emerges as a date when the incident may have taken place. Aside from the change in characters involved in the incident and the slightly later date involved, the aboriginal origins postulated in this paper remain unaltered.

The Cartier Incident - Prehistoric Associations

The crux of the Thevet text lies in ascertaining who the 'someone' was who first noted the sap flow described by Cartier. Thevet does not make it clear whether he was Indian or French. However it is clear that the Captain is describing generally a land unfamiliar to the French. Among all that is unfamiliar he elects to describe a particular and to him strange tree. It is so strange to Frenchmen that he can best describe its shape and size by comparing it with a walnut tree that grows in France, and the sap which flows from it in the spring he compares with good French wine. Probably this unfamiliarity is due, in part, to his having seen the copious spring sap flow he describes only twice at best - in the spring of 1536 and in the spring of 1542. Clearly the text describes a new experience which, to Cartier, is peculiar to the region he calls Canada and which he may have seen but twice during the few weeks that sap runs each spring.

This is in sharp contrast to the Captain's explanation that "for a long time" the tree was believed to be fit for nothing. It is difficult indeed to equate, reasonably, the short periods Cartier was present in the Canada region during the spring sap run with "a long time". The people who had been in the Canada region for a long time were the Indians Cartier met. It seems likely that it was 'one day' that 'someone' of them who first discovered the copious flow of sweet sap when certain trees, including the maple, are cut in the spring.

The explanation that the tree had not been used for a long time before someone noticed the flow of sweet sap seems likely to reflect those recounted to Cartier when he enquired into this, to him, strange phenomenon.

Thevet's text states that the Captain and his company were able to collect four or five large pots of sap in an hour. But they were not able to do so until "once they had the experience". This suggests that the incident described concerns Cartier's introduction to the tree-tapping and sap collecting process. However adept the novice Frenchmen may have been it is unlikely that they could be so efficient in their initial encounter to be able

to collect the large quantity described in so short a time. It seems more likely that they were drawing on Indian experience and skills "practiced from time out of mind".

There is also the pertinent observation that events which pre-date Cartier's arrival in the Canada region are, by definition, pre-historic, Cartier's visit being the first recorded presence of a European in this region.

Earliest Sap Harvests

It has been noted earlier that previous attempts to establish the prehistoric origin for the maple sugar industry lacked credibility because the earliest records then known do not suggest that sufficient sap was accumulated to permit boiling. Lescarbot (1618, 3:194) describes the Indians sucking sap from the trees in the vicinity of Port Royal in 1607. Sagard (1632, p.99) explains how in the spring of 1524 the Hurons sucked sap from beech trees (maple ?) in Huronia. LeJeune (Thwaites J.R. 6:73) describes how the Gaspé Indians in 1676 ate 'Michtan' (maple ?) wood-chips for the sweet sap they contained. In each case sap was not collected but sipped directly from the tree in a miniscule quantity.

The incident described by Thevet is wholly different. Although there is no precise information on the size of the vessels used to collect the sap, they are described as 'large', presumably to convey the impression that a large amount of sap was collected. Bearing in mind the slow rate by which sap accumulates when the sap runs best, it can only be concluded that a large number of trees must have been tapped to accumulate four or five large pots of sap in one hour.

There need be no hesitancy in accepting the Indians' ability to handle sap in large quantities. From the earliest times there are records of their having large bark vessels. Champlain (Biggar 1929, 3:123) describes the use of "great casks, made of tree-bark" by the Hurons during his visit in 1615-16. Sagard (1632, pp. 95, 106) mentions the "large vats or casks of tree-bark" he observed in Huronia during 1623-24. Lafitau (1724, p. 94) mentions how they "make transverse incisions with an axe on the tree trunk from which flows in abundance a liquid which they collect in great (large) bark vessels". Although much later, Smith (1799) mentions how, during his captivity in 1755, sap was stored in bark vats capable of holding "about 100 gallons each", this gives some idea of the large size these bark containers might reach.

The accumulation of sap mentioned by Thevet suggests that many trees were tapped in the Canada region in the spring of 1536 or 1542. This is in sharp contrast to the practices observed in Huronia and Gaspesia early in the 17th

Century when sap was sipped from the trees or wood-chips. Possibly the maple industry was a more important food source in the Canada region than it was in Huronia or Gaspesia, if not on a continuing basis at least on these occasions when it was observed upon. There remains too the possibility that all the occasions upon which it was observed were not recorded. This could be due to the variability in the size of the industry which was dependant upon the year-to-year flow of sap and the importance of maple sugar as a food at that time in that particular location.

Discovery not Dependant upon European Vessels

Commencing with Charlevoix's opinions regarding the Indians' ability to make sugar using aboriginal vessels (1744, 5:179-181, 6:47) through to Morgan's (1901, 1:187, note 1) and Henning's (1965, p. 30) reservations, there is an assumption that sap can only be reduced to syrup or sugar by boiling. It appears to have been overlooked that the sap can be concentrated by exposing it to the heat of the sun and by discarding the ice from frozen sap. Beverley (1705, p. 21; 1722, p. 108) explains how English soldiers in Virginia 'discovered' maple sugar in 1675 by noticing the sugar crystals left on trees where sap had been evaporated by the sun. Aside from the fact that their 'discovery' is over a century late, this incident suggests one means by which maple sugar could have been discovered without the need to involve native vessels for boiling. Jenness (1935, p. 13) explains how in 1929 in the Parry Sound area he observed the Ojibwa running sap onto large sheets of birch bark to have the sun reduce it to syrup and eventually to toffee. Smith (1775, pp. 68-69) describes how during his captivity the Indians "had no large kettles with us this year and they made the frost in some measure supply the place of fire in making sugar. Their large bark vessels, for holding the stock water, they made broad and shallow; and as the weather is very cold here, it frequently freezes at night in sugar time; the ice they break and cast out of the vessels ... I observed that after several times freezing, the water that remained in the vessel changed its colour and became very sweet". Rush (1793, p. 69) explains that by freezing sap "one-half of a given quantity of sap reduced in this way is better than one-third of the same quantity reduced by boiling".

Aside from the scale of production possible, maple sugar could have been discovered by the Indians using any of these techniques individually or in combination, none of which would have involved boiling. However, as Henshaw (1890, p. 348) has observed" ... sap would naturally first be used as a beverage; but the discovery of the art of boiling it down could not long have been delayed, though the freezing process may have been first in order of time".

These observations do not proscribe the possibility that maple sugar was discovered by the Indians directly as a result of boiling. Champlain (Biggar, 1929, pp. 126-128) and Sagard (1632, pp. 108-109) leave no doubt that the Indians boiled their food in bark and earthenware containers before European vessels became available. Charlevoix (1744, 6:47) too concedes that it was possible to boil in the vessels available to the natives. There is abundant archaeological evidence of ceramic pots having been used for boiling in prehistoric times. Certainly there should be no question regarding the Indians' ability to boil in their native vessels.

Maple sugar need not have been discovered as a result of the precipitous introduction of an innovative boiling technology not available previously, although that possibility can not be overlooked. It seems more likely that so simple and sequential a process could not long escape discovery once there was an accumulation of sap such as that described by Thevet as early as 1536. Although he had earlier opted for sugar-making to be contingent upon the availability of European metal vessels, that possibility did not escape Ganong (LeClercq, 1691, p. 123) who observed, "... the boiling of some sap caught in a kettle and accidentally mistaken for water would lead to the natural discovery of the sugar". An Algonkian legend set out in Part 2 of this paper (page 32) describes just such an eventuality. Indeed it may have been the source of Ganong's suggestion.

Scholars Not Supporting Aboriginality

Charlevoix, whose certain reservations have been discussed, is not the only scholar who does not favour aboriginality. Ganong (LeClercq, 1691, p. 123) contends that, "if maple sugar making was aboriginal and in existence long prior to the earliest mentions of it, it is very difficult to understand how it could have escaped mention in the many minute accounts of Indian life not only in the Jesuit Relations but in many other writings besides; and the omission becomes quite incomprehensible in the face of the fact that maple sap is so often mentioned". He concludes, "It looks very much as if the making of sugar was not pre-historic, but, though of Indian origin was not commenced until about 1675. Indeed its beginning may be connected with the extensive introduction of metal kettles, for, the boiling of sap to sugar in aboriginal troughs heated with hot stones, must have been not only too trying for aboriginal industry but one rather unlikely to have been hit upon by any known aboriginal housekeeping arrangements". His setting 1675 as the approximate date of its introduction by the French contrasts sharply with Boyle's observations prior to 1663 when he first learned of its manufacture in Massachusetts.

Sulte (1921) concludes that because Boucher (1664) does not mention maple sugar "Therefore the Canadians did not make it". He leaves no doubt why in his opinion the Indians could not have made sugar, "They were too limited to understand the methods and they lacked the necessary equipment", and again, "They were much too limited to conceive such an invention". He remarks that "even the French did not think immediately of boiling this liquid to extricate sugar". Sulte explains, "I insist in the absence of any mention of syrup and sugar before La Hontan's (sic) letter which dates from 1685 when Sarrazin arrived in Quebec", presumably in ignorance of Boyle's paper. Rousseau (1969, p. 597) has rejected Sulte's hypothesis. Neither is Seguin's (1975, p. 28) statement that "No sugar was made before 1691" borne out. In a more cogent vein Sulte notes that both Talon and Colbert strongly encouraged industries in New France. Had there been a native maple sugar industry, Sulte feels it would have been exploited and become the subject of some importance in their despatches to France for "Our Governors and Intendants didn't build a birch-bark canoe without notifying Versailles". He overlooks Charlevoix's (1744, 5: 179-181) explanation that "It would have become a branch of the trade" but "there is not sufficient quantity made" for export. Sulte emphasizes Ganong's earlier observation (op. cit.) noting that despatches by Talon, Frontenac, Barre, Denonville, Meulle and Champigny make no mention of the maple industry. Sulte concludes they knew nothing of it.

In 1851 Morgan opined "Whether they learned the art from us, or we received it from them is uncertain" (1901, 2:27) and "Whether they learned the art from us or we from them, may be a difficult question; although the former would seem to be the more probable from the want of suitable vessels among them for boiling". Morgan's probabilities have become certainties over the years and the earliest observations regarding the Indians' ability to boil in their vessels has received little recognition in this context.

Henning (1965, p. 21) notes that prior to Boyle's observation in 1664 (sic) (1663) there is no record of maple products other than sap in the New World. He argues spuriously, "Had the Indians been producing syrup and sugar from maple trees when the settlers moved into the New World these persons would not have been so concerned about the importation of (cane) sugar or bees for honey". He remarks (ibid) that Hariot (Lorant 1946, p. 258), writing on the natural resources of Virginia between 1584 and 1587, describes a maple tree but makes no mention of sap. Thevet's 1557 text regarding Cartier's experience in 1536 or 1542 contradicts these observations regarding the use of sap and provides an example of the dangers in extrapolating too wide spatially from a single local reference.

Sy (1908, p. 250) notes that David Boyle the archaeologist, not to be confused with Robert Boyle, did not agree that maple sugar was originated by the Indians. Boyle attributed its origin to the French as a result of it being introduced early in the 16th Century by "a Dr. Saussure", presumably meaning Dr. Sarrazin. If that is so, his views on origins would

seem to have originated with Sulte as has been explained. Sarrazin's interest in botany dates from 1687, the late 17th Century, rather than the early 16th Century which suggests Boyle was not a serious student regarding the origins of maple sugar.

The temporal and spatial concentration of LeClercq's observations in 1676 and those made by the gentlemen from New England and Massachusetts prior to 1663 focuses the earliest records of maple sugar in northeast North America. This makes spurious any argument regarding European origins for maple sugar that is premised upon the need for the early settlers in Carolina, Virginia, West New Jersey, Pennsylvania and Delaware to establish trade with the West Indies to obtain cane sugar because maple sugar was unknown at that early date (Henning 1965, 20-21, 37, 89). Henning may have interpreted there being insufficient maple sugar in those southern areas to meet the requirements of the settlers to indicate that it did not exist further north.

Scholars Supporting Aboriginality

There are more scholars who support aboriginality than there are who do not; and they are in more diverse fields. Kalm in 1751 (Larsen 1939, p. 153), Kohl (1859, p. 318), Henshaw (1890, pp. 342, 344, 348-349), Chamberlain (1891b) Ely (1891, p. 201), Carr (1896, p. 170), Lloyd (1901, p. 251, note 87), Sy (1908, p. 249), Parker (1910, p. 104), Barbeau (1915, p. 110), Waugh (1916, p. 142), Smith (1933, p. 93), Barbeau (1946) and Seguin (1975) all favour aboriginality basing their argument on various amalgamations, but not all, of the sources set out in Part 2 of this paper.

Henshaw in his treatise 'Indian Origin of Maple Sugar' (1890, p. 342) opines, "Considering the great familiarity of the Indians with the natural edible products of America, and the general ignorance of the Europeans on this subject, it is fairly to be inferred that the a priori likelihood of the discovery of the properties of the maple sap is all in favour of the Indian". He goes on to say that, "If the matter is not referred to, (in the earliest chronicles) its absence cannot be taken as conclusive either as to aboriginal or European origin. Many customs of the Indians far more important than this received but the briefest mention by the early narrators or are not mentioned at all". Cartier provided Thevet with the information set out in his maple text although he neglected to include it in his own accounts of his voyages.

Morgan (1901, 1:175, 2:27) remarks upon the antiquity of the Maple Festival and the Maple Dance in the Iroquois religious calendar, then negates that possibility by suggesting that a European origin is "probable" (ibid. 1:186, note 1). Henshaw (1890, p. 347), on the other hand, sees the association of

maple products with the Iroquois religious calendar as evidence of their aboriginality.

Earlier chroniclers like Lafitau (1724, 2:94) who, as a result of his observations in 1712-1717, notes that "The French work it (maple sugar) a little better than the Indian women from whom they have learned to make it"; Rale (Thwaites, J.R. 67:93-95) who remarks that in Maine in 1722 "There is no lack of (maple) sugar in these forests"; LeBeau (1738, 2:8, 12, 15) who explains how in 1731 the Mohawk made sugar in their village in the Mohawk River valley; Maillard (1758, pp. 76-77) who describes the production of sugar as early as 1735 in Nova Scotia; and subsequent accounts by some of the scholars whose works are mentioned in Part 2 of this paper do not contribute significantly to the argument in favour of aboriginality. This is not a judgement on the scholarly value of their work. Rather it is intended to draw attention to the fact that their work does not encompass the time period, or the references, in which the prime references to aboriginality occur.

LeJeune (1634), Loskiel (1794, p. 67), James (1830, pp. 294, 321), Chamberlain (1891(a), p. 42), Hoffman (1893, p. 315), Morgan (1901, p. 180), Sy (1908, p. 252), Parker (1910, p. 104), Waugh (1916, p. 142) and Barbeau (1946, p. 81) observe that both the Iroquoians and the Algonkians had their own vocabulary which they used in connection with the maple industry. This is in sharp contrast with the Indian vocabulary used in connection with the honey-bee industry which was introduced by the Europeans. In that case European words were adopted by the Indians. Barton (1793, p. 252) argues convincingly that had the maple industry been introduced by the Europeans a European vocabulary, or translations of European words, would have been adopted by the Indians for the maple industry too. That not being the case, the origin of maple sugar by Europeans in unlikely. Henshaw (1890) supports this thesis.

CONCLUSION

Thevet's account indicates that by the spring of 1536 or 1542, possibly as late as 1543, the Indians in the Canada region had mastered the techniques necessary to allow them to tap many trees and collect large amounts of sap. It is likely that they had acquired the skills and competence before they were first displayed to the French, whether 'the Captain' be Cartier, Roberval or Alfonse. These explorers, being the first Europeans to visit the Canada region and adjacent lands in the St. Lawrence River Valley, by their very presence introduce the historic period. Events which precede their presences, including the period in which the Indians acquired the skills to tap trees and collect large quantities of sap, lie in the prehistoric era.

There is no evidence of sap being made into sugar at this date. However, the processes by which sap may be converted to syrup or sugar need no be set in motion deliberately. They may come about naturally or be caused to occur accidentally. Large accumulations of sap similar to that described by Thevet would provide an opportunity in which either, or both, eventualities could occur. Residual accumulations of sap in containers, or natural accumulations on tree trunks, would be turned to syrup or sugar as a result of evaporation by the sun. Alternatively, exposed sap could freeze causing those wishing to use it to discard the ice and thereby learn that the sweetness of the sap had increased. Sap mistaken for water or used as water to boil food would soon lead to the discovery of syrup and sugar.

The quantity of sugar which might be produced in any of these eventualities is not likely to be significant in the first instance. However, once the simple process had been detected it would not long have preceded deliberate production of sugar by boiling. The amount of sugar produced would be limited only by the accumulations of sap available and the need for it as a food supply. There need be no reservation regarding the suitability of native wooden, bark or earthenware vessels for boiling sap. There is ample evidence in the earliest records of their being used to boil food. This is not to deny that European metal kettles would be better suited to produce better quality sugar in greater quantities with greater convenience.

As might be expected, natural philosophers and botanical scholars were first to record this sylvan phenomenon. The Honorable Robert Boyle having studied and written on sugar, recorded in 1663 the first accounts of sugar being made from tree sap by evaporation in Massachusetts prior to 1660 or 1661. Unfortunately, he does not provide any information on its origin. The first eye-witness account is given more than fifteen years later by LeClercq who observed it being made by the Indians in Gaspe as early as 1676. In 1684 and 1685 the process was brought to the attention of the members of the Royal Society, London, with the advice that "The Savages of Canada ... have practiced this Art, longer then (sic) any now living among them, can remember". Ray, the noted botanist of the day, when confronted with a specimen of maple sugar from Canada in March, 1684, stated it was "a thing to me strange and before unheard of". This opinion was accepted by the Royal Society, whose members might be expected to be familiar with the natural products of Europe and further afield, thereby lending credibility to the claim for its having an Indian and prehistoric origin. Later in 1688 Ray published his monumental botanical work 'Historia Plantarum' in which he noted that the Indians of Canada made sugar from tree sap. Had the earlier references to the Indian origin of this sugar by Ray in 1684 and by Evelyn (Aston?) in 1685 or Boyles inference in 1663 been shown to be incorrect, it is most unlikely that Ray would repeat error in his major work in 1688. By that date LeClercq had already seen the Indians in Gaspé making sugar and considered it to be sufficiently novel as to remark that "little loaves ... are sent to France as a curiosity ...". Had the production

of sugar from tree sap been practised in Europe it is likely that Ray would have encountered it during his three-year botanical expedition to Europe, including France, during 1663-1666. Had it been known in Europe by 1663 it is unlikely that its Indian origin would have evoked such interest by botanical scholars like Boyle, Ray, Lister and Evelyn. Neither would it warrant special attention by LeClercq.

Whether the Indians accidentally discovered the evaporation of sap to make sugar or learned from observing natural phenomenon, or whether they knowingly invented it, there can be little doubt that those in the Canada region could not long have handled the large quantities of sap described by Thevet as early as 1535 without learning to make sugar.

PART 2 - SOURCES

ETHNOLOGICAL REFERENCES

Oral traditions retain many of the oldest and most important aspects of the Iroquoian and Algonkian cultures. Probably the myths regarding cosmology are among their oldest traditions. Although it is not possible to date these traditions with any certainty the fact that they set out, among other things, beliefs regarding the origins of the earth and the Indian people themselves suggests that they incorporate their most ancient beliefs. Undoubtedly changes occurred with the passage of time, and as Hewitt (1928, p. 453) has mentioned, there can be little doubt that when these myths and legends were first recorded by Europeans they had already incorporated changes as a result of the nearly 300 years of Indian and European contact. Nevertheless these traditions do contain some of the most ancient knowledge we have of Indian customs and the antiquity of maple products can be appreciated, if not measured, from the place they hold in these ancient ceremonies and traditions.

The pan-Iroquoian 'Earth Grasper' or 'Sky Holder' cosmological myth, sometimes known as 'The Woman who fell from the Sky', exists in some twenty-five versions. Fenton (1962, p. 285) maintains that the Huron version first recorded by Sagard in 1623 (1632, p. 169) and heard by the Jesuit missionaries Brébeuf (J.R. 10: 125-139) and Ragueneau over the next ten years, is sufficiently similar structurally to the elaborate texts Hewitt (1903-1928) obtained from informants living at the close of the last century to warrant it being considered a single continuous mythological tradition. Fenton (ibid.) concludes that this myth has three hundred years of recorded history and that it extends into pre-Columbian times.

An Onondaga version of the pan-Iroquoian 'Earth Grasper' cosmological myth recounts that De-hae-hiyawa-kho said "So then I have assigned to a certain kind of tree the duty that it shall exude customarily a sap which shall be called sugar ... It is that, then, that I have appointed to this duty what will be called the Maple ... At that time (in the spring) it will then be possible that it shall exude sap which will become sugar". From these cosmological beginnings maple sap has long played a major role as a beverage in the Iroquoian Maple Festival and in all of the dances associated with the Four Ceremonies which too were originated by De-hae-hiyawa-kho "In the first place" (Hewitt 1928, p. 605).

A Mohawk cosmological myth recorded in 1896-97 on the Grand River reservation (Hewitt 1903) also attests to the antiquity of the importance of the maple in Iroquoian culture. Aataentsic, the mother of mankind who originally dwelt in the sky and fell to earth, first gave birth to twin boys.

In the Mohawk myth one twin is called Maple Sapling (Wa-ta Oterontonni a) and it is he who caused the maple to grow and spread throughout the land. There is also an Onondaga version of the myth in which the twin is simply called Sapling (Odendonni a) (ibid. p. 141). Although these myths do not mention maple products the antiquity attributed to the maple as a special tree is established. This in turn associates the Maple Festival and the use of the maple sap in the Four Ceremonies with the earliest events in their cosmology.

Barbeau (1915, pp. 45-46) records a Wyandot cosmological myth given in English in Oklahoma in 1911 in which the twin boys are called 'Good One' and 'Evil One'. "Good One ... made all kinds of trees ... The Maple was made so that syrup would just drip out when the tree was tapped. Then came the Evil One ... into the maple tree he poured some water and in that way thinned the syrup into sap which could not be reduced into sugar without exacting labour and trouble". In another version of this myth also recorded by Barbeau in 1911 in Oklahoma (ibid. pp. 47-49) "The Good One made the sugar trees (maples), the sap of which was pure syrup, running easily from the tapped trees. Only a little boiling made it into sugar. The evil brother poured water into the trees, so that there was no more syrup, but only sweet water, as we now find it. It is only after long and patient boiling that we can now reduce it to sugar".

Not all variants of the Iroquoian cosmological myth make specific reference to maple products. Nevertheless the essential ingredients regarding the maple are pan-Iroquoian as is evidenced by the Wyandot myth recorded by Schoolcraft in 1837 (1875, pp. 207-210), by Connelly (1899, p. 67 ff), by Barbeau (1915) and by Hewitt (1903, pp. 133-339) in their records of Onondaga, Seneca and Mohawk myths and by Hewitt (1928, pp. 453-819) in his record of the long Onondaga 'Earth Grasper' myth.

Chafe (1961) recounts two Seneca thanksgiving rituals. In one the Creator decided that "the maples will stand on the earth and the sweet liquid will drip from them ... when the earth becomes warm then the sap will flow ... And for those people who take notice of it, it contains unchanged: they do indeed tap them and store the sugar" (ibid., p. 25). In the other ceremony the Creator "... chose a certain tree ... and this they call the maple ... . You (the Creator) said, 'They will store it away, first boiling it down'. You said, "It will become sugar'".

Foster (1974, p. 113) suggests that in common with the other ceremonies associated with the first fruits, the Maple Festival "derive from a northern Woodlands hunting-and-gathering substratum, probably considerably older than the ceremonies associated with agriculture which have a distinct southern cast" Foster (pers. comm. 1977) has drawn my attention to the Cayuga 'Bush Dance' which "is considered to be closely related to the Maple Festival" or the "Thanks to the Maple". This 'Bush Dance' is a beseeching rite and a precursor to the Maple Festival in which the Creator responds by letting the sap flow. The Maple Festival is then held to express gratitude to the Creator. Foster

(ibid. p. 147) also notes that the Iroquoian 'Great Feather Dance', which "is one of the most sacred expressions of thanksgiving in the longhouse repertoire" includes specific reference to maple sugar. Indeed all of the 'hierarchial' speeches mention trees and their 'principal' The Maple: The Thanksgiving Address, The Skin (or Drum) Dance, the Tobacco Invocation (Mid-Winter) and the Great Feather Dance. Although both Beauchamp (1888, p. 200) and Tooker (1964, pp. 72-78) omit the Maple Festival from their lists of festivals, the pan-Iroquoian occurrence of the Maple Festival in the religious calendar suggests the use of maple products by the Iroquoians enjoys the same antiquity as the cosmographical myths.

Clearly the Maple Festival is an entrenched piece of Iroquoian ceremonialism which can not be explained as being the product of their contact with Europeans.

Aside from cosmological myths and ceremonial rituals, there are Iroquoian legends of some antiquity which make reference to maple products. Hewitt (1918, pp. 525-537) in 1896 on the Cattaragus reservation collected the text of the Seneca "Legend of Honenhineh and his Younger Brothers" which gives recipes for three meat and corn dishes in which maple sugar is used. In one instance reference is made to the maple sugar being stored in a "bark case". The legend goes on to explain that the two brothers involved in this tale were murdered and cooked in a "great clay pot". The reference to storing maple sugar in a bark case and the clay pot both suggests antiquity commensurate with the use of bark vessels and clay pots by the Seneca, a practice that soon died when European metal vessels became available.

Clark (1849, 1:54) observes that among the Onondaga "the first of these festivals is held in the spring, directly after the season for making sugar is past. They give thanks for the abundance of sap, and for the quantity of sugar they have been permitted to make".

Smith (1883, p. 115) describes an Iroquois dance, possibly Foster's 'Bush Dance', "the performance of which will, it is hoped, bring warmer weather and cause the sap to flow". The Nearings (1950, p. 27) suggest that "This intimate fusion of their work and religious customs is further evidence of the antiquity, the veneration and knowledge of the maple among them".

Beauchamp (1888, p. 200) in his paper 'Onondaga Customs' mentions that years ago the Onondaga used to go to a grove near Onondaga Lake in the spring to make maple sugar, and in the fall to the salt springs to boil salt. Without reference to their practice of making maple sugar, which may have been an ancient custom in this context, it should be clear that its association here with salt does not endow it with antiquity. The Iroquois did not use salt before it was introduced by the Europeans, although the Onondaga, for instance, had ready access to salt in the Salina, New York, area.

Parker (1910, p. 102) explains, "The Iroquois will ever remember the maple tree, but few now even remember the tradition of how it was during the maple sap season, that the Laurentian Iroquois struck their blow for freedom from

Adirondack domination and fled into northern and central New York. (One Mohawk tradition relates that the women flung hot maple sap into the face of the Algonquin Chiefs and thus helped their people in the fight for independence)".

Barbeau (1915, p. 110) describes a Huron-Wyandot folk-tale in which a sugar-tree spirit appeared to a woman making maple sugar to give her a talisman which assisted her in her task.

Akgonkian legends also mention maple products in a context that suggests their manufacture enjoys considerable antiquity over a large area. Blackbird (1887, p. 72) in his 'History of the Ottawa and Chippewa in Michigan' makes reference to a legend in which "the sugar trees did produce sap at certain seasons of the year which was almost like a pure syrup; but when the mischievous Naw-bo-zhoo had tasted it, he said to himself, 'This will not do. My nephews will obtain this sugar too easily in the future time and the sugar will be worthless'. So he diluted the sap until he could not taste any sweetness. Then he said 'Now my nephews will have to labour hard to make sugar out of this sap, and the sugar will be much more useful to them in the future time'. Naw-bo-zhoo was an Algonquian creature of the 'creation age' which suggests some antiquity for this legend. Blackbird's account closely resembles the Menominee legend Chamberlain (1891(a), pp. 39-43) quotes as follows: "One day Nokomis, the grandmother of Manabush was in the forest and accidentally cut the bark of a tree. Seeing that a thick syrup exuded from the cut, she put her finger to the substance, and upon tasting it found it to be very sweet and agreeable. She then gave some of it to her grandson, Manabush, who liked it very much, but thought that if the syrup ran from the trees in such a state it would case idleness among women. He then told Nakomis that in order to give his 'nunts' (sic) employment and keep them from idleness he would dilute the thick sap whereupon he took a vessel of water and poured it over the tops of the trees, and thus was reduced the sap to its present consistency. This is why the women have to boil down the sap to make syrup". Hoffman (1893, p. 173) and Skinner (1921, pp. 164-165) recite variants of this legend which too are attributed to the Menominee. Possibly these four Algonkian references to maple products have the same antiquity as that given the Wyandot cosmographical myth (Barbeau 1915, pp. 45-46) which they so closely resemble. Certainly the core theme enjoys widespread acceptance by both the Iroquoians and the Algonkian which suggests that it has considerable antiquity.

As a preamble to the Menominee legend Hoffman (ibid. p. 173) recounts how Nokomis had Manabush collect birch bark to make vessels in which to place the maple sugar she planned to make. He describes how she tapped the trees which suddenly gave off thick maple syrup. How Manabush diluted the syrup in the trees so they gave only sap follows on from this experience as told by the Menominee.

Leland (1881, p. 121) relates a Penobscot legend in which "Wasis was the Baby. And he sat on the floor sucking a piece of maple-sugar greatly contented ..." and that "Wasis sat still and sucked his maple-sugar". Mecheling (1914,

p. 10) recounts two Malecite 'Gluskap' myths which mention maple products. One he recorded in New Brunswick in 1910 states that Mikumwesu's wife lost their son when she visited an old woman who was collecting sap. The other (ibid. p. 80) states that "One day Loup Cervier went to tap maple trees for the purpose of making sugar ...". These tales are believed by the Indians to have the same antiquity as Gluskap, or Mikumwesu, who lived in the earliest days of creation (Day, pers, comm.).

Day (1976) notes that the St. Francis Abenaki still recount how families hiding in the cornfields during the Iroquois raid in 1690 gave the children maple sugar to suck on to keep them from crying and betraying their whereabouts to the Iroquois.

There are other Algonkian legends which mention maple products but they may not have appreciable antiquity in the form in which they are recited. Nevertheless the core theme may be very old. Leland (1884, p. 118) records a Passamoquoddy and Micmac legend "How Gluskap Conquered the Great Bull-Frog" which states in part "Truly, I would be pleased with a slice of hot venison dipped in maple sugar and bears oil. Nay, give me for my share succotash and honey". The reference to honey suggests that this version originated after the Europeans had introduced the honey bee to North America. Neither is the use of sliced meat likely to have great antiquity. Leland and Prince (1902, p. 150) reiterate a very close paraphrase of this legend as a Passamoquoddy poem. Parsons (1925, p. 128 and note 3) has recorded a Micmac tale in that language in which Red Fox and the 'the Daigel' (tiger) joined forces to make a barrel of maple sugar. She points out that it seems likely to have been derived from a negro legend which originates in Florida. Generally folk-lorists have tended to give an Indian origin to shared tales on the grounds that they were extant before the negroes.

Jenks (1904, p. 34) recounts an Ojibwa folk-tale from Wisconsin in which a bear and maple sugar play a large part. Skinner and Satterlee (1915, p. 298) describe an encounter between Manabus (sic) and a pair of partridge making maple sugar. Both these tales involve animal and bird life in a human context which cannot be taken literally.

An Algonkian Abenaki legend, which was brought to my attention by Dr. Gordon Day, Canadian Ethnology Service, National Museum of Man, tells of a woman who having been left to boil meat for the evening meal in melted snow became so engrossed in her work on a mocassin that she let the pot boil dry. Realizing there would not be time to melt more snow before her husband returned, she replaced the water with maple sap. Once again she busied herself with the mocassin and it was not before she heard her husband returning that she realized the meat had boiled dry again. Fearful of her husband's anger, she did. After some time she looked out to see her husband eating with relish the sugar-coated meat that had boilewd dry in the sap. Greedy not to waste a morsel she saw him break the pot and eat the encrusted sugar. This brings to

mind Lafitau's complaint "That sugar made by the Indian women almost always had a little burned taste" (Lafitau, 1724, p.94).

The Nearings (1950, p.26) erroneously attribute a variant of this Algonkian legend to the Iroquois although it involves the Algonkian 'Wokosis' (sic).

EARLY CHRONICLERS

The first reference to the use of maple sap in the New World is found in Thevet's work 'Les Singularitez de la France antarctique, autremont nommée Amérique: & de plusieurs Terres & Isles decouvertes de notre temps' which was first published in Paris in 1557 and again identically in 1558. The full text is as follows:

> "The land known as Canada is beautiful and well located and of its nature excellant, save only the harshness of its climate, which is not an advantage, as you can well imagine. A number of trees and fruits are found there, that are unknown to us over here. One of these is a tree that in size and form resembles a large walnut tree such as grow in our country. For a long time it was thought that these trees were fit for nothing, and accordingly they were little known. One day, however, someone cut down one of them, and found that the sap which poured forth from it possessed a fine delicate taste resembling that of one of the good wines of Orleans or Beaune. A number of our party, including the Captain and other gentlemen of his company, once they had the experience pronounced it delicious, so much so that in an hour they filled four or five large pots with sap. I leave you to imagine how zealously the Canadians, much liking the drink I have described, now care for these trees in order to make it, inasmuch as it is of such surpassing excellence. The tree is known in the local tongue as the Couton".

The French text reads:

> "Le pais & terrouër de Canada, est beau & bien situé, & de soy tresbon,hormis l'intemperature du ciel, qui le defouorise: comme pouvez aysément con ecturer. Il porte plusieurs arbres et fruits, dont nous n'avons la congnoissance par deca. Entre lesquels y a un arbre de la grosseur & forme d'un gros noyer de deça, lequel a demeuré long temp inutile, & sans eitre cognu, insques à tant que quelcun le voulant coupper

en faillit un suc, lequel sut trouvé d'autant bon goust, & delicat, que le bon vin d'Orleans, ou de Beaune: mesmes fut ainsi iugé par noz gens, quilors en firent l'experience: c'est à sçauoir le Captaine, & autres gentilshommes de sa compagnie: & recueillirent de ce ins sur l'heure de quatre à cinq grand pots. Je vous laisse à penser, si depuis ces Canadiens afriandez à ceste liqueur, ne gardent pas cest arbre cherement, pour leur bruvage, puis qu'il est ainsi excellent. Cest arbre, en leur langue est appele Couton".

In his later work 'Cosmographie Universelle' (1575, pp.1008-1016) Thevet presents a paraphrase of this text which does not include the sap collecting incident by 'the Captain'. The 'gros noyer de deca' becomes the 'gros noyer pardeça' and the Indian name for it changes from 'Couton' to 'Cotony'. Rousseau (1937, p.29) opines that Thevet refers to the sugar maple.

The next reference, which occurred about half a century after Thevet's work, is by Lescarbot (1618, 3:194) regarding his observations at Port Royal in the spring of 1607 while a member of de Mont's and Poutrincourt's expedition. He describes the use of sap by the Indians as follows: "If they are tormented with thirst, they have the skill to suck certain trees, whence trickles a sweet and very pleasant liquor, as I myself have sometimes proved". Grant (ibid. footnote 2) opines that this was maple sap. Lescarbot's Indian cook does not include maple sugar in his recipes (Stewart et al. 1960, p.16).

Sagard (1632, pp.99) observed this same practice among the Huron seventeen years later in the spring of 1624 where, "If they have an urgent thirst and no water they know how to suck from the trees, and in particular from beech-trees, out of which distils a sweet and very pleasant liquid at the time the trees are in sap, as we also did". He remarks (ibid. pp. 82-82) that "we French would sometimes make an incision in the bark of some big beech tree (fouteau) and holding a bowl underneath get the juice and liquid that dropped from it; this served as a tonic for the digestion whenever we were indisposed in that way". LeClercq quotes from this account of Sagard's in his work 'First Establishment of the Faith' (1691, 1:208) without adding any new information. Ganong (ibid., p.122, note 2) in his edition of LeClercq's work suggests that Sagard errs in naming the beech as the source of this sap. He believes it to be the maple. Sagard (ibid. pp.108-109) describes how,

"Before the arrival of the French in the country of the Canadians and the other nomad tribes their entire household material was only of wood, bark, or stone... even kettles, buckets, or troughs for cooking their meat, which they cooked, or rather made tender in the following manner. They heated a quantity of stones and gravel red hot in a good fire, then they threw them in a kettle filled with water in which was the meat or the fish to be cooked, and whenever they took these out they put in others in

their place, and in the course of time the water was heated and so cooked the meat to some extent. But the Hurons and other sedentary tribes and nations used and knew how to make earthware pots, as they still do, firing them in their ovens. These are very good and do not break when set on the fire even though they may not have water in them. But they cannot stand moisture and cold water for long, but become soft and break at the least blow given them; otherwise they last a very long time".

Champlain is strangely silent on the maple industry. His sole reference to the maple (Biggar 1922, 1:145) is made during his voyage in 1603 when he notes it presence on the St. Lawrence River in the area of Contrecoeur. However, he did not land at Tadoussac until May 26th when the maple industry would no longer be active that spring. Neither does he mention it when recounting his experiences in Huronia over the winter of 1615-16. Having remained in Huronia until May 22nd, 1616, it might be expected that he would have observed the use of sap by the Huron in the spring of 1616 as Sagard did later in 1624 and Boucher over the period 1637-1641.

LeJeune in his Relation for 1634 (Thwaites J.R. 6:273) notes the use of sap by the Montagnais; "When they are pressed by famine they eat the shavings or bark of a certain tree which they call 'Michtan' which they split in the spring and get from it a juice, sweet as honey or sugar. I have been told this by several but they do not enjoy much of it, so scanty is the flow". Thwaites (ibid. p.329, footnote 24) explains that the 'Michtan' tree was the sugar maple. In LeJeune's Relations for 1634 (Thwites J.R. 14:41) Mercier explains how the use of sugar helps in their work in the Huron mission. This and several other references indexed by Thwaites under 'sugar' refer to sugar brought in from France, not to maple sugar.

The earliest extended reference to sugar being made from tree sap was published in 1663 although the event must have taken place before 1660 or 1661 because the papers went to press at that time (Boyle 1772, 1:lxix). It was the Honorable Robert Boyle who wrote (ibid. 2:111), "there is in some parts of New England, a kind of tree so like our walnut-trees, that it is there so-called; whose juice, that weeps out of its incisions, etc, if it be permitted slowly to exhale away the superfluous moisture, doth congeal into a sweet and saccharine substance: and the like was confirmed to me, upon his own knowledge, by the agent of the great and populous colony of the Masasachusets" (sic).

Nicolas Denys (1672, pp.380-381) recounting his experiences among the Micmac over the period 1632-1688 in the area between the Penobscot River and Gaspé (Acadia) explains, "That tree (maple?) has sap different from that of all others. There is made from it a beverage very pleasing to drink, of the colour of Spanish wine but not so good. It has a sweetness which renders it of a very good taste; it does not inconvenience the stomach". He goes on to describe how the trees are tapped and states that "This is the drink of the Indians, and even of the French, who are fond of it".

Pierre Boucher (1664, p.31) remarking in part upon his stay among the Huron during the period 1637-1641 wrote, "There is a kind of tree called maple, which grows very large and high... When gashes are made in these trees in the spring, there runs out from them a quantity of water which is sweeter than sugar and water or at least more pleasant to drink". Sulte (1896, p.134) mentions this reference in his work.

While with the Huron mission in 1653 (Thwaites J.R., 66:25) Mercier wished he "had a few drops of Spanish wine... and some little dainties such as sugar". As has been noted, this and several other references to sugar indexed by Thwaites under 'sugar' are mentioned in a context which indicates that they refer to cane sugar from France, not maple sugar.

Nouvel in his Relation for 1671-72 (Thwaites J.R., 56:101) extends the use of sap to the Algonkians in the upper Ottawa River valley and the regions north and east of Georgian Bay. He describes how during his mission among the Ottawa or Ekaentouton he baptized a young man, "... not with natural water but with a certain liquor that runs from the trees toward the end of the winter and is known as Maple water...which being naturally sweet..." He hastens to explain that upon learning of his mistake he was "obliged to repair that error - happily a little before he died".

LeClercq (1691, pp.122-123) writing of his experiences in 'Gaspesia' among the Micmac commencing in 1675 and intermittently thereafter until 1687 explains that, "The water of the maple... is equally delicious to French and Indians, who take their fill of it in the spring." He states that it was "abundant in Gaspesia". Having described how the trees are tapped he goes on to give the first recorded eye-witness account of the production of maple syrup and maple sugar. "A thing which seemed to me very remarkable in the maple water is that, that if by virtue of boiling, it is reduced to a third, it becomes a real syrup, which hardens to something like sugar, and takes on a reddish colour. It is formed into little loaves which are sent to France as a curiosity..."

In 1798 the 'Phylosophical Magazine', Volume 1, published an article under the title "Of an attempt to make the Maple Sugar above a hundred years ago" quoting a letter dated Londor, March 10th, 1684, which a Dr. Robinson (1798, p:322) wrote to John Ray, Black Notley, Essex, noted botanist and author of 'Historia Plantarum', as follows: "I have enclosed you some sugar of the first boiling got from the juice of the wounded maple: Mr. Ashton (sic), Secretary to the Royal Society, presented it to me. 'Twas sent from Canada, where the natives prepare it from said juice; eight pints yielding commonly a pound of sugar. The Indians have practiced it time out of mind; the French begin now to refine it, and turn it to much advantage. If you have any of these trees by you, could you not make the trial, proceeding as with the sugar cane?" In a letter dated Black Notley, April 1st, 1684, Ray (1798, 1:322) replied: "Yours of the 10th instant I received, and therein an enclosed specimen of the Canadian sugar, a thing to me strange and before unheard of". He goes on to explain how he had "an ingenious apothecary" carry out the experiment suggested by Dr. Robinson. Having boiled "the juice of the greater maple, a tree that

grows freely half a mile off from my residence" he had "made an extract, he found a whitish substance, ('sugar sand'?) like to brown sugar, and tasting very sweet, immersed in a substance of the colour and consistency of molasses. Upon curing, I have no doubt it will make perfect sugar". Edlin (pers. comm.) has noted that Evelyn has explained that the "ingenious apothecary" was Dr. Martin Lister and that, "Mr. Ray and Dr. Lister prepared a tolerable sort of sugar from our greater maple" (Acer pseudoplatanus L.).

A somewhat parallel account appeared in the 'Philosophical Transactions' of the Royal Society of London for 1684-85 (Aston, 1686, Vol. 15, No. 171, 1st Ser. p.988) under the title "An Account of the Sort of Sugar made from the Juice of the Maple, in Canada". Edlin (pers. comm.) states that Evelyn wrote this account. It may have been written by Mr. Aston then Secretary to the Royal Society. It reads in part, "The Savages of Canada, in the time that the sap rises in the Maple, make an incision in the tree, by which it runs out; and after they have evaporated 8 pounds of the liquor there remains one pound as Sweet, and as much Sugar, as that which is got out of the Canes; Part of the same Sugar, is sent to be refined in Roven (sic) (Rouen?). The Savages here have practiced this Art, longer then (sic) any now living among them, can remember. There is made with this Sugar, a very good Syrup of Maiden Hair, and other Capiliary Plants, which is used in France".

During his travels in 1680 Hennepin (1698, pp.147, 153) observed the production of maple sugar from sap but gives no opinion of where the industry originated.

Lom D'Arce de Lahontan (1703, 1:106) describes how in the Green Bay area, Wisconsin, in 1688 the Indians gave him to drink "a pleasant liquor which was a syrup of the maple beat up with water". Neville et al (1893, p.70) give an account of this incident. They explain that "some inhabitants of Canada might draw twenty hogsheads (1,050 imperial gallons) of it (sap) in one day, if they would but thus cut and notch all the maple trees of their respective plantations" and "of this sap they make sugar and syrup which is so vulnerable that there can't be a better remedy for fortifying the stomach" (ibid. 1:249). He remarks with disappointment that although maple sap "has a much pleasanter taste then the best lemonade or cherry-water.... but few of the inhabitants that have the patience to make them (syrup and sugar).... there are scarce anybody but children who give themselves the trouble of tapping these trees". These observations by Lahontan may date from as early as 1684 (Hayne 1969, p.440).

Ray in his monumental 'Historia Plantarum' (1688, 2:1701) describes the "Acer majus, multis falso Platanus J.B. majus Ger. majus latifolium, Sycomorus falso dictum Park. montanum canadidum C.B. The Greater Maple, commonly yet falsly, the Sycamore Tree", (A. pseudoplatanus) which grows in England and observes: "Succus hic Saccharum non obscure resipit, unde Canadenses Americani ex eo Arundinum liquoris in modum decocto Sacchari quoddam genus conficiunt, ab arundineo discretu haud facile, cujus portiunculam munere ingeniosissimi &

eruditissimi Viri D. Francisci Aston R.S. olim Secretarii, Habemus". (This sap has a flavour quite similar to a kind of sugar, from which the American Canadians produce a certain sweet juice from a liquid, in a manner similar to the production of a medicinal potion. By a rather difficult means of distillation we have a small quantity, which can be attributed to that most talented, well informed and learned man Francis Aston, former Secretary of the Royal Society).

There is an entry in the account books of the Hotel Dieu, Quebec, dated 1693 which states: "20 pounds (livres) of sugar and small houragans for the chief nurse". Barbeau (1946, p.81) suggests that this was maple sugar and that 'houragans' was the French equivalent to the Algonkian 'ouragan', a conical birch-bark vessel used to store maple sugar.

Dr. Michael Sarrazin (1732, pp.65-66), probably became interested in botany in 1697 (Rousseau 1969, p.594) but possibly as early as 1687 when as a member of Denonville's expedition against the Iroquois in what is now New York State he remarked on the 'plane-trees' found in Iroquois country, or even as early as 1685 when he first arrived in Canada. He noted that the Indians and the French were aware of sap and that upon "leaving it to evaporate, one is left with about one-twentieth of its weight which is veritable sugar". Sulte (1921) suggests that Sarrazin was the originator of the maple sugar industry. This opinion has been adopted by Roy (1919-28, 5:144) and Vallée (1927, p.98). Rousseau (1969, p.597) opines "Sarrazin's role, pending proof to the contrary, was confined to a scientific study of the sugar maple".

Diereville (1710, pp. 109-110) recounts his experiences in the spring of 1700 in Acadia in a poem extolling the virtues of maple sugar. He explains how tres are tapped and how sap is boiled to become first syrup and then "a reddish sugar which is very good". He indicates that sycamore sap was also used but Webster (ibid. p.117) points out that this tree does not grow in Acadia.

By 1706 considerable sugar was being produced in New France as a result of the 1703-05 British blockade which had cut off supplies from France and the West Indies. On October 5th of that year Vaudreuil and Raudot reported to the minstry of Marine (Fauteaux 1927, 2:395) that Mme. Legardeur de Repentigny "does not exaggerate when she states that 30,000 pounds of maple sugar are made annually on the Island of Montreal and in the neighbourhood" (Rousseau 1969, p.597). There is also evidence that the St. Francis Abenaki made an unusually large amount of maple sugar in 1704 (Day, pers. comm.). This greatly expanded use of maple sugar suggests that later records regarding its use by the Indians or the Europeans are more likely to reflect this increased production than they are to illuminate the origin of the industry.

Catalogne (1712, pp. 101, 108) notes from his observations which could date from as early as 1682, although his work 'Report on the Seigniories and Settlements in the Districts of Quebec, Three Rivers, and Montreal' was carried out during the period 1710-1712, that the Iroquois of the Sault au Récolet and

the Sault St. Louis missions make maple sugar which they sell in Montreal. He remarks that only the women are engaged in this work.

Lafitau (1724, 2:94) referring to his first-hand observations at the Sault St. Louis mission during the period 1712-1717 explains how maples are tapped and the sap stored in large bark vessels. "Then they boil this liquid over a fire, which boils away all the water and thickens the rest to the consistency of syrup, or even of loaf sugar, according to the degree and quantity of heat which they wish to give it. There is no other mystery in it. This sugar is very healing admirable for medicines; but, although it is more healthful than that of the cane, it has not its charm or delicacy, and almost always has a little burnt taste. The French work it a little better than the Indian women, from whom they have learned to make it; but they have not succeeded in whitening and refining it". Lafitau's illustration of the native Indian maple industry (ibid. pl. vii), Plate 1, includes a typical early Iroquoian longhouse, typical Iroquois bark and earthenware vessels and European metal vessels. These components indicate that he elected to depict a scene during the early contact period when both native ceramic and European metal vessels were in use. His presentation of maple industry in this context suggests that Lafitau believed it flourished during that early period, some considerable time before he arrived in New France. The illustration 'Maple Sugar Indian Camp' attributed to Lafitau by Orr (1915, p.16), Plate 2, is a much altered copy of Lafitau's illustration.

In the account books of the General Hospital, Quebec City, there are entries in 1714, 1722, 1725, 1771, 1777, 1802 and 1826 recording the purchase of maple sugar (Barbeau 1946, p.79). Accounts for 1786, 1792, 1795 and 1821 show that the Hotel Dieu too bought maple sugar during those periods (ibid.).

Dudley (1723, p.27) provides " an account of the method of making sugar from the juice of the maple here in New England" prior to 1720 but he makes no suggestion regarding the origin of the process.

Charlevoix (1744, 5:179-181) gives a detailed account of his visit to the Abenaki village on the St.Francis River in March 1721 where some Algonquins, Sokokies and Mahingans (sic) also lived. "I was regaled here with the juice of the maple; this is the season for its flowing. It is extremely delicious, has a most pleasing coolness and is exceedingly wholesome; the manner of extracting it is very simple". Following a description of how the trees were tapped he goes on to say, "The further method they use to make sugar of is to let it boil, until it makes a sufficient consistence, when it purifies of its own accord, without the mixture of any foreign ingredient. Only they must be very careful that the sugar be not over-boiled, and to skim it well ... This sugar when made with care, which it certainly requires, is a natural pectoral, and does not burn the stomach ... Some however prefer that made from the ash, but there is very little made of it". "It is very probable the Indians who are perfectly well-acquainted with all the virtues of their plants, have at all times, as well as at this day, made constant use of this liquor (sap). But it

is certain, they were ignorant of the art of making sugar from it, which we have since learnt them. They are satisfied with two or three boilings, to make it a little thicker and to make a kind of sugar from it which is pleasant enough". "It would have been a branch of the trade" but "there is not sufficient quantity made" for export. He considered the process still to be sufficiently novel as to send "some of it to a (cane sugar) refiner in Orleans (France)". He explains, "The nations of the south had only vessels of baked earth to dress their meat. In the north they used vessels of wood and they made the water boil by throwing in some stones made red hot. They found our iron and tin kettles much more convenient..." (ibid. 6:47).

Father Sabastien Rale (Râle, Rasle, Rasles) in a letter to his nephew in 1722 (Thwaites J.R. 67:93-95) notes that when with an Abenaki tribe on the Kennebec River in Maine; Flannery (1939, p.22) indicates it was the Norridgewock, Schuette and Schuette (1935, p.215) use the equivalent Nanrantsouak; "... my only nourishment is pounded corn of which I make every day a sort of broth; that I cook in water. The only improvement that I can supply for it is, to mix it with a little sugar ... There is no lack of sugar in these forests. In the spring the maple trees contain a fluid somewhat resembling that which the (sugar) canes of the islands contain. The women busy themselves in receiving it into vessels of bark, when it trickles from these trees; they boil it, and obtain from it fairly good sugar". His observation that, "The first of which is always the best" holds to this day. In his memoirs covering the period 1693-1724 as a missionary among the Abenaki he remarks, "It is curious to know that the method of extracting the bayberry wax and making maple sugar, articles of considerable importance to us, has been learned from the aborigines".

LeBeau (1738, 2:8, 12, 45) recounts an experience he alleges to have taken place in April 1721 when he visited the village of Naranzouac which he claims to be Mohawk. Although his narrative is believed to be fiction (Fenton, pers. comm.) he explains how they tap the maple in March and how the sap is gathered in bark vessels to be boiled to make syrup or sugar. He also remarks on the use of maple sugar in sagamite. His observation that, "There is nothing of a mystery of this (making sugar). The French work better than the Savages from whom they learned how to do it but they (the French) continue on to the end where they bleach and refine it" (ibid. pp.45, 46). His remark resembles that made by Lafitau (1724, 2:94) who, when having described how sap is boiled to make sugar, also concluded, "There is no other mystery in it".

Maillard (1758, pp.76-77) writing of his experience in Cape Breton among the Micmac and Malecite as early as 1735 in what is now Nova Scotia remarks, "... towards the end of March, or at the latest, the middle of April ... Then are made the sugar and syrups of maple procured from the juice or sap of that tree".

These are what may be called the primary references to the maple industry. It is interesting to note that of the fourteen instances in which the origin

of maple sugar can be attributed to the Indians only four are associated with the Iroquoians, two in Quebec and one each in Ontario and New York. The other ten instances concern the Algonkians seven in 'Gaspesia', two in Quebec and one in Ontario.

LATER REFERENCES

By mid-18th Century the number of references to the maple industry and maple products increase greatly. About 1765 maple sugar appears in literature as a medium of exchange between the Indians and the colonists (Grignon, 1857, p.255; Pond 1906, p.244) giving rise to numerous references having no bearing on this thesis. However some references are well known and sometimes they are quoted as germane to a discussion regarding the origins of the maple industry. To avoid leaving the impression that they have been overlooked the more important of these, and those often quoted, are included here.

Williamson (1832, 1:490) in his 'History of Maine' mentions that during the period 1615-1675 the Indians in that area "... with the sap of the sugar maple boiled to molasses, they sweeten their cakes" but fails to give a source for his information. He does not suggest an origin for the industry. Pellett (1938, p.3) remarks in his authoritative 'History of American Beekeeping' that by 1650 maple sugar production was such that "honey and maple sugar were the usual sources of sweets since commercial sugar as we know it had not come into use". Pastorius (1700, p.383) describing agriculture in Pennsyvania in 1700 explains that by that date grain and cattle were being sold in the Barbados in return for sugar, among other items. Duhamel du Monceau (1755, pp.17-36) lists the maple and plane trees found in France and North America commenting on the relative merits of each as a source of sap from which syrup and sugar can be made. Although he mentions his use of Sarazzin's work (1732) and Gaultier's work (Rousseau 1969, p.596), which was written before 1750 (ibid.), he does not become involved in the origin of maple sugar. Gaultier (1775, pp.378-392) gives an account of the manufacture of sugar but does not suggest its origin. Bartram (1751, p.39) as a result of his trip overland in 1743 from Pernnsylvania to Oswego, New York, describes the Onondaga maple industry at that date. He also explains how they mix maple sugar with their parched corn (ibid. p.71). Kalm (1772, 1:132) observes that 'in Canada they make both treacle and sugar". In his diary for March 1745 (ibid. p.188) he notes that the Indians "started to tap the maple and make sugar" and in an entry for 1749 (ibid. p.229) he explains that "We extracted a great deal of sugar from the sap of the sugar maple, the red maple and the wild cherry". In his 1751 work he includes a paper 'Description of how Sugar is made from Various Types of Trees in North America' (Larsen 1939, pp.149-156) in which he states (ibid.

pp.150-153) "From prehistoric times long before the Europeans arrived the savages made sugar and sweet things from trees and plants growing around them". He goes on to give a list of five trees and two 'herbs' used for this purpose. Although he states that, "The sugar maple is the chief tree fromn which sugar has been made in America from ancient times", he does not elaborate on the reason why he believes the industry to be prehistoric.

Belknap (1792, 3:113-116) in his 'History of New Hampshire' describes how in 1755 great quantities of maple sugar were made in the vicinity of the Mississquoi River and in 1784 in the White Mountains but gives no opinion on its origin. Jefferys (1761, p.41) remarks that "this tree affords great quantities of a cooling wholesome liquor from which they make a sort of sugar". Zeisberger (1768, p.36), a Moravian missionary among the Delaware and Onondaga, notes in his diary on April 30th, 1768, that the Indians had been boiling sap in what is now Pennsylvania where there were "the largest water-beeches and sugar trees one may see anywhere". Heckewelder (1819, p.194), another Moravian missionary in Pennsylvania during the decade following 1771, notes that the Indians sometimes sweeten their corn pottage with the "molasses of the sugar-maple tree". Hollingsworth (1786, pp.21-22) mentions sugar being manufactured in Nova Scotia but provides no opinion of its origin. Loskiel (1794, pp.67, 72-73) describes how the Iroquois and Delaware used maple sugar in their recipes with corn and how the latter call the maple the 'stone tree' because of its hardness. He makes no mention of the origin of the maple industry. Sturtevant (1919, p.21) appears to use the Jeffreys' 1761 reference (op. cit.) as the basis for his opinion that the Indians originated maple products in prehistoric times.

Many others have recorded the use of maple products by the Indians. Some refer to the primary source outlined above while others incorporate secondary sources. Sometimes these accounts are embellished by the experiences of the local settlers and other later European influences. Principal among these are: Anonymous (1693-1831); Lemery (1745, p.351); Hopkins(1753, p.38); Rogers (1765, p.251); Adair (1775, p.416); Carver (1778, pp.262, 282, 496); Anonymous (1778, p.141); Rush (1793, pp.69, 74); Rouchefoucald (1799, p.217); Hunter (1823, pp.298, 313); Keating (1824, 1:114); Jackson (1830, pp.16, 18); Williamson (1832, 1:490); Goodrich (1844, p.204); Schoolcraft (1852, 2:55-56; 1884, p.199); Jones (1854, pp.23-27); Kohl (1859, p.139-140); Traill (1860, p.62); Dodge (1860, p.30); Poore (1866, p.500); Palmer (1871, p.412); Crowell (1877, p.332); Ely (1891); Hoffman (1896, p.288); Carr (1896, pp.170-171, 181-182); Gifford (1907); Harrington (1908, pp.582-587; 1913, p.221); Ganong (1910), p.122); Parker (1910, pp.102-103, 119); Waugh (1916, pp.81, 88, 140-143, 147, 149); Densmore (1928, p.321); Douglas (1931); Smith (1933, p.93); Hedrick (1933, pp.35, 146); Flannery (1939, p.22); Speck (1945, p.85); Carse (1949, p.19); Fenton (1951, pp42, 62, 65; 1978, p.298); Guillet (1963, pp.252-262); Tooker (1964, p.69; Seguin (1967(b), pp.41-45; 1975, pp.27-32) and Heidenreich (1971, p.201).

There are extant many other primary and secondary references regarding the maple industry which are not included here because they are not germane to a discussion on the origin of the industry. The Nearing's "The Maple Sugar Book" and the Schuettes' and Ihde's comprehensive "Maple Sugar: A Bibliography of Early Records", Part 1 (Schuette and Schuette, 1935) and Part 2 (Schuette and Ihde, 1946) list many of these references.

Under the provocative title "Who First Made Maple Sugar", 'The American Antiquarian' (1890, Vol. 12, No. 3, pp.176-177 and No. 4, p.234) sets out correspondence between William Wye Smith and "R.C." in which Smith explains that he has discovered emblematic mounds on the Milwaukee, Rock, Crawfish, Sugar and Wisconsin rivers in the midst of sugar maples which convey the idea that they were built by the Mound-builders while they were making maple sugar. The editor opines in a footnote "that maple sugar was made in prehistoric times" without elaboration. Advice contained in 'The Gentlemens Magazine' (Anon. 1765, Vol. 35, p.439) stating that "The Americans have discovered a method of making sugar from a liquid procured by boring the maple tree" does not help much.

TREATISES

In 1851 Lewis Henry Morgan published his monumental "League of the Ho-de-no-sau-nee, or Iroquois", a later edition of which appeared in 1901 edited by H.M. Lloyd. In that work (1901, 1:180-186) he describes the 'Thanks to the Maple' festival as an important event in the Iroquois religious calendar which, he states, "has undergone no changes in centuries" (ibid. 1:175). He goes on to state that "One evidence, at least, of its antiquity (maple sugar) among them is to be found in one of their ancient religious festivals, instituted to the maple, and called the Maple dance" (ibid. 2:27). Although he makes it clear, "Our Indian population have long been in the habit of manufacturing sugar from the maple" (ibid. 2:27) and again "The Iroquois have long been in the habit of manufacturing sugar from maple" (ibid. 1:186) he twice ponders its origin. "Whether they learned the art from us, or we received it from them is uncertain" (ibid. 2:27) and again "Whether they learned the art from us or we from them, may be a difficult question; although the former (Europeans) would seem to be the more probable from the want of suitable vessels among them for boiling" (ibid. 1:186, note 1). Here Morgan, echoing Charlevoix's earlier reservation, raises what must be the most common objection raised by anthropologists seeking to refute the aboriginal origin of maple sugar - the want of suitable vessels for boiling. Archaeologists faced with great numbers of ceramic potsherds which show clearly their having come from pots in which food has been boiled, do not have the same reservations.

Morgan also observes (ibid., 2:31) that a "favourite food for the hunter was charred corn, which, parched a second time, was mixed with about one-third part of maple sugar and ground into a fine flour". While Morgan may have obtained this recipe from a contemporary source it reflects earlier observations and recipes by Joutel, Rale, Smith, Heckewelder, Loskiel or Rush regarding corn and sugar mixtures. Sagard (1632, p.153) explains how Huron warriors on the war-path carried "a bag full of corn meal roasted and scorched in the ashes" but makes no mention of maple sugar.

Morgan's opinion that the Europeans had originated the manufacture of maple sugar because that "would seem to be the more probable from the want of suitable vessels among them for boiling" went unchallenged for thirty-nine years. In 1980 H.W. Henshaw published a paper "Indian Origin of Maple Sugar" in the 'American Anthropologist' stating his intention "to present some evidence tending to show that there is still another important product (maple sugar) for which civilized man is indebted to the Indian". Having made it clear that he was "not prepared to say whether the earliest chronicles, say 1600-1675, contain information as to the Indian or European discovery of maple-sugar making" he quotes Joutel, Lafitau, Bossu, Keating, Rush and Henry as evidence of Indian origins. He places some importance on Lafitau's opinion, which dates from 1712-1717, that "The French make it better than the Indian women, from whom they have learned how to make it" (Henshaw's italics). He refers to Smith's captivity quoting from Drake's work (1851, p.197) and uses that portion of Morgan's work which supports Indian origins (1901, 2:27). Menominee and Ojibwa myths and the wholly native vocabulary used by the Indians in connection with the maple industry are quoted to support his thesis. Henshaw concludes "At all events it appears to offer at least presumptive proof that the Indians were in nowise indebted to the European for their knowledge of maple sugar" (ibid. p.351).

Henshaw's work was not long without support. In 1891 A.F. Chamberlain published a paper in the 'American Anthropologist' entitled "The Maple Amongst the Algonkian Tribes". He commends Henshaw for having "shed new light upon a very interesting question" and states that "Beside the date contained in it (Henshaw's paper) there exist some other notices which inferentially prove the Indian origin of maple sugar" (ibid. p.39). He goes on to quote from Rale, Jones et al, LaHonton (sic), Carver and Hunter and various Algonkian legends which support aboriginality. He concludes with a detailed comparison of numerous Algonkian words associated with the maple industry in support of Henshaw's observation on the wholly native vocabulary used by the Indians in connection with the maple industry.

That same year (1891) Chamberlain published another paper in the 'American Anthropologist' - "Maple Sugar and the Indian". It commenced "I have come across some very interesting evidence not previously noted". He then sets out in detail the first modern reference to the correspondence which took place between Dr. Robinson and Mr. Ray in England in 1684 which states that the

manufacture of maple sugar was originated by the Indians and adopted by the French. He goes on to quote Dudley (1723) and Poore (1866) and some later information regarding the industry in Vermont. He notes without comment "the curious information that 'The Americans have discovered a method of making sugar from a liquor procured by boring the maple tree' contained in the 'Gentlemans Magazine' (1765, Vol. 35, p.439).

In the 1901 edition of Morgan's 'League', Lloyd makes it clear that he does not agree with Morgan's conlusion that it was 'probable' that the Indians learned to make maple sugar from the Europeans and that was "the more probable from the want of suitable vessels among them for boiling" (op. cit.). Lloyd later states (Morgan 1901, p.251, note 87), "It is practically certain that Indians made both syrup and sugar long before they knew any white man". Contrary to Morgan's opinion he goes on to say, "Iroquois earthenware answered excellently for the necessary evapouration". Possibly he is reflecting Sagard's observation regarding the ability of the Huron and other sedentary tribes to boil in their earthenware vessels set in the fire (Sagard, 1632, pp.108-109).

Sy writing in 1908 (pp.249-254) making reference to Morgan, Lafitau, Bossu, LeClercq, Boucher, Boyle, Joutel, Lahontan, Rale, Hennepin, Smith, Rush, Sagard and Denys, concludes that, "Maple syrup and sugar belong to North America" (ibid. p.249). He notes the existence of a native Indian vocabulary and remarks upon the fact that the evaporation of sap in the sun will produce crude sugar in support of aboriginality.

In 1921 Sulte published a paper 'History of Maple Sugar' in which he quotes from Sagard, LeJeune, Boucher, Boyle, Charlevoix, Talon, Nouvel, Marmette, Lahontan, Diereville, LeClercq, Catalogne, Lafitau, Kalm, J-C.B., and other references less germane. Having discussed Dr. Sarrazin's varied career and noted that there is in the record no mention of a date when the Canadians began to treat maple sap scientifically he speculates, "But it does authorize a hypothesis which seems to be very justifiable. Having arrived in 1685, Sarrazin must have known of maple sap from the following spring onwards and have started to analyse it immediately - boiling it - in a word studying it as he did with thousands of plants and natural products, the observation of which occupied him all his life. ... One can therefore believe that a number of people began to imitate him. This would be about the time LaHontan (sic) wrote that the art of making sugar was becoming widespread in our countries ... As for the people at Chicago (Bossu 1771; 1:188-189) it was not surprising that they had maple sugar in 1688 as since their relations with the French, which was continuous since 1659, they had produced cauldrons - not surprising then that their French friends taught them to boil maple sap". He concludes "I insist in the absence of any mention of syrup or sugar before Lahontan (sic) letter (1703) which dates from 1685, just when Dr. Sarrazin arrived in Quebec. I insist on this point - the Indians never boiled sap before the advent of the French, and furthermore it was scarcely before 1685 that the French advised

them to do so". Clearly this overlooks Boyle's 1663 essay. Parenthetically, and for a better understanding on why Sulte might look to Lahontan for the origin of maple sugar, it is noted that Lahontan spent three months during the winter of 1685-86 living with an Indian party some forty leagues north of the St. Lawrence River (Hayne 1969, p. 440) where he may have observed the production of maple sugar that spring. Rousseau (1969, p. 597) notes Sulte's, Roy's and Vallée's opinions regarding Sarrazin originating the maple sugar industry and opines, "Sarrazin's role, pending proof to the contrary, was confined to a scientific study of the sugar maple".

In 1935 H.A. Schuette and Sybil C. Scheutte published a paper "Maple Sugar: A Bibliography of Early Records" in the 'Transactions' of the Wisconsin Academy of Sciences, Arts & Letters. In 1946 H.A. Schuette and A.J. Ihde published Part 2 of the same title in the same Transactions. Although the authors of Part 1 state the "it is not an exhaustive compilation" (ibid. p.209) these papers are by far the most complete bibliography available. These works are compiled chronologically with no weighting as to the source of the information. As a result they do not readily facilitate a conclusion regarding the origin of the maple industry regardless of their significant value as source references. The authors of Part 2 note that "The question of whether the Indians made sugar or even syrup is controversial. The writings of Thornton (1684), Aston (1686), Beverley (1722), Keating (1824), Lahontan (1703) and Verwyst (1744) permits the assumption that sugar-making was probably a native art. Charlevoix (1721) on the other hand, contends that while they made constant use of the sap, the Indians learned from the white man how to make sugar" (ibid. pp.89-90). The authors do not go further in suggesting the origin of the maple industry. It should be noted that neither of these works include the Thevet 'Singularitez' reference.

Marius Barbeau published a paper "Maple Sugar: Its Native origin" in 1946 which he quotes Fauteau, Lahontan, Charlevoix, Rush, Hedrick and the Hotel Dieu and General Hospital accounts books. Curiously he came to no conclusion on the origin of the maple sugar industry, other than that inferred by his provocative title. In an earlier work (1915, p.110) he stated "The Iroquoian tribes knew how to make maple sugar before the coming of the whites". Is is clear (1946, p.81) that he believed the Iroquois boiled sap in their earthenware vessels.

Helen and Scott Nearing's work "The Maple Sugar Book" published in 1950 contains two chapters which are relevent to this paper. Chapter 1, 'Sugar from Trees' records the earliest references to sweets and sugar commencing with Virgil c.40 B.C. and the first mention of sugar recorded in China in the eighth century B.C. In the context of this paper they quote from Evelyn, Rochefoucauld, Rush and Nouvel. Chapter 2, 'Indians, the First Maple-Sugar Makers', sets out evidence in support of the chapter title. They quote from Lescarbot, LeJeune, Denys, Rasles (Rale), Gifford, Keating, Beverley, Lafitau, Bossu, Charlevoix, Henshaw, Hoffman, Hunter, Smith (1979), Schoolcraft, Traill, Smith (1883), Henry, Hopkins, La Houtan (sic), Joutel, Kalm, Carver, Rush,

Heckewelder, Goodrich, Poore, Kohl and Densmore. The Algonkian words for 'maple sugar' used by the Algonkian, Ojibwa and Cree are quoted and an Algonkian legend on how maple sugar was discovered is erroneously attributed to the Iroquois. The third chapter, 'The Early Settlers Make Syrup and Sugar' and subsequent chapters are not germane to this paper. The Nearings conclude by quoting from Ely (1891), "As evidence of history and of language thus combine to support the same proposition, it seems only reasonable to accept their decision that it is, after all, to the Indian that we are indebted for the important and natural product of maple sugar" (1950, p.39). The Nearings do not mention Thevet.

Darrell David Henning in 1965 submitted a thesis "The Origins and History of the Maple Products Industry" to the State University of New York College at Oneonta under its Cooperstown Graduate Programs in partial fullfilment of the requirements for the degree of Master of Arts. "Chapters 1-4 attempt to prove that the indigenous peoples of North America, the American Indian, did not make maple syrup and sugar prior to the arrival of the Europeans" (ibid. p.1). The remainder of the thesis is concerned with the history and technology of the maple industry to date. He makes reference to the following in the sequence indicated: Boyle, Hariot, Myers, Cartier, Lescarbot, LeJeune, Champlain, Sagard, Boucher, Denys, Nouvel, Rasles (Rale), Hennepin, Robinson, Ray, Joutel, Penicout, Beverley, Lahontan, Bartram, Pond and Mercier. From these references Henning argues that "until 1664 there is no mention of maple products, other than sap, in the New World. Had the Indians been producing syrup and sugar from maple trees at the time when settlers were moving into the New World these persons would not have been so concerned about importation of sugar or bees for honey. An examination of the early records indicates that they traded their surpluses for, among other things, sugar from the Islands in the Caribbean Sea" (ibid. pp.20-21). "The Jesuit missionaries were among the first Europeans to have much contact with the Indians ... . The production of maple sugar in North America would sureley have been noted in their journals, had this been the practice in the north. They do mention that the natives drink the sap of the maple tree as early as 1634" (ibid. pp.26-27). "Until the year 1664 (sic) when the Honourable Robert Boyle mentions sugar from trees in Massachusets there is no mention of maple products other than sap". From Boyle's account he opines "it would appear that we have the beginnings of the maple sugar industry ... From this date and on we find that the Indians from New England to Canada and into the interior are producing maple products ... It is easy to see how the technology of producing maple syrup spread so rapidly from its conception by Europeans ... once they (the Indians) learned the technique of reducing the sap, it could be accomplished with the utensils they had. This technique of reducing the sap would have been greatly augmented with the use of metal containers, an important item of trade, with which to boil the sap ... In no instance were the Indians using native utensils for boiling instead of iron and brass kettles of European origin ... In fact, the only references which would

indicate that the Indians boiled sap by the hot stone method or in pottery vessels were related to Europeans, not observed, or are hypothetical. When there are first hand accounts concerning the manner in which the Indians boiled sap, it is with metal containers" (ibid. pp.29-35, passim). Henning concludes that sugar not available to the Jesuits in Huronia as late as 1653 because "The Indians had not yet learned that if they boiled the maple sap they could get sugar. No one had showed them how" (ibid. p.48). Quoting from Myers 1912, (Pastorius, 1700, p.162, passim) Henning (1965, pp.89) advances the argument that the settlers in the area of Pennsylvanian, West New Jersey and Delaware would not have engaged so heavily in trade with the Barbados seeking sugar during the early part of the period of 1630-1707 had maple sugar been available. Henning also notes that Beverly (1722, p.108) attributes the discovery of maple sugar in Virginia to English soldiers 135 years after the earliest description of Indian foods in that area which did not mention maple products. He concludes (ibid. pp.90-93) that, while the Indians were familiar with sap as a beverage, it was the Europeans who having tapped trees in Europe and being familiar with the sugar-cane industry, taught the Indians to boil sap about 1664. Thereafter the simple technique spread rapidly.

It is pertinent to note that not one of these treatise makes reference to Thevet's 1557 or 1558 'Singularitez' text.

SOURCES FOR SAP

Thevet's reference to the 'noyer de deca' and the 'noyer pardeça', a walnut tree, is not unique. From the earliest times there is mention of a number of trees used by the Indians as a source for sap. Sagard (1632, pp.83. 99) mentions the 'fouteau' (beech?) in 1624. Ganong (1910, p.122) believes Sagard erred and that the maple is correct. LeJeune in 1634 (Thwaites J.R. 6:273) mentions the 'Michtan' which Thwaites (ibid. p.320) believes to be the maple. Diereville (1710, pp.109-110) mentions the sycamore but Webster (ibid., p.117) points out that the sycamore A. pseudoplatanus is not native to Acadia. Webster may be confusing Platanus occidentalis L. with A. pseudoplatanus L. which is sometimes called 'sycamore'. Duhamel du Morceau (1755, p.32) explains that the red maple (Acer rubrum L.) was called 'plane tree' (A. pseudoplatanus) by the Canadians. It seems likely that the earliest chroniclers were not sufficiently familiar with New World trees to make identification certain. Duhamel du Morceau (1755, pp.27-36) and Ganong (1910, pp. 197-242) are but two scholars who make this clear. Lafitau (1724, 2:29) mentions the walnut and ash; Charlevoix (1744, 5:181, 194, 247-250) the red maple, the cherry, ash and various types of walnut. Sheppard (1829, p.23) remarks that of nine varieties of maples found in America the one Charlevoix mentions, Acer rubrum, makes

sugar inferior in quality to the Acer saccharinum and Acer nigrum. Boyle in 1663 (1772, 2:111) attributes sap from which sugar is made to a "tree so like our own walnut trees, that it is there (in Massachusetts) so called". Kalm (Larsen 1939, p.152) suggests that Charlevoix includes the ash in error and believes it should be the ash-leafed maple, or Manitoba maple (Acer negundo L.).

Later records mention the Indians using sap from the sugar maple, red maple, sugar birch, hickory and honey locust (Kalm 1751, pp.150-151); the water beech (Zeisberger 1768, p.36); the red maple, sugar maple, wild cherry and sugar birch (Kalm 1772 1:188; 2:411); the plane, wild cherry, ash and walnut (J.-C.B. 1941, p. 93); the red maple and chestnut oak (Collin 1793, p.xxi); the box elder (Hunter 1823, p.315); the birch (Hunter 1824, p. 415); the ash-leafed maple or Manitoba maple (Hind 1860, 1:228); the hickory (Belknap 1792, p. 100; Waugh 1916, p. 142) and various types of birch (Hardy 1869, p.41). Day (pers. comm.) is aware of sugar made from the butternut and the use of the ash-leafed maple by the Abenaki to make sugar.

The Indians also used the sweet juices of plants. Champlain (Biggar 1929, p.130) and Sagard (1632, pp.70,72) mention the Huron practice of sucking young corn stalks. Lafitau (1724, 2:93) confirms this practice and mentions that these stems are called 'ohere'. Charlevoix (1744, 1:250) mentions the 'cotton-tree', "a plant which sprouts like asparagus, to grow to a height of about three feet, and at the end grow several tufts of flowers. In the morning before the dew has fallen off, they shake the flowers and there falls from it, with the humidity, a kind of honey which by boiling is reduced to a kind of sugar". Sturtevant (1919, p.71) attributes this information to Jefferys (1761, p.42) and identifies the 'cotton-tree' as the Asclepias syriaca or 'milkweed' plant. He also notes that the Sioux on the upper Platte made a sugar from the flowers of the Asclepias tuberosa or 'butterfly' weed. Sarrazin (1732, p.66) mentions in close association with his remarks on the maple industry that a plant, 'Apocynum majus, Syriscum: recutm, Com. 90' also gives a sweet juice but does not state specifically that it was used by the Indians.

The Cherokee are said to have extracted "saccharine from the pod of honey locust, using the powdered pods to sweeten parched corn and to make a sweet drink" (Henshaw 1890, p.349). Boyle (op. cit.) reports that in New England they "made such a syrup with the juice of the watermelons".

WIDE DISTRIBUTION

There is ample evidence to show that the use of tree sap, and upon occasion, syrup and sugar, made from tree sap, extended over a wide area beyond New France and New England. Joutel (1714, p.179), while on the Gulf of Mexico in

the Matagorda Bay area of Texas with LaSalle on his last voyage, stated in March, 1668 "... we discovered a kind of manna, which was a great help to us. It was sort of tree, resembling our maple, in which we made incisions, whence flow's a sweet liquor. There being no sugar cane in that country, those trees supply'd that liquor which when boil'd up and evaporated turned into a kind of sugar somewhat brownish, but very good". Henshaw (1890, p. 343) quotes this example of its widespread use as evidence that the industry had been originated by the Indians. He used Margry (1883, 3:510) and the publications of the French History Collection, Louisiana (1846, 1:216) as references. As early as 1584 the maple was noted in Virginia (Hariot 1588, p.23). Beverley (1705, 2:21; 1722, p.118) states the "The sugar-tree yields a kind of sap or juice, which by boiling is made into sugar". He explains (ibid.) "Though this discovery has not been made by the English above 28 or 30 years, yet it has been known among the Indians before the English settled there". He explains that the English soldiers discovered it on the frontier as a result of sap having evapourated on the tree trunks in the heat of the sun to leave sugar which they tasted. Byrd (1928) mentions sugar in letters to England from Virginia in 1729 but gives no indication of the origin. Lawson (1718, p.105) writing in this 'Natural History of Carolina' observes that a 'sugar-tree' "like one sort of maple" grows there and that "the Indians tap it and make gourds to receive the liquor ... and boil it to just the consistence of sugar ...". LaFrance during his travels in the Lake-of-the-Woods and Lake Winnipeg area during 1739-42 found the Assiniboines on the West shore of "Lake Owinipique" making sugar from birch sap (Whillans 1955, p.21). Hind (1860, 1:142) remarks on the use of sap from the ash-leafed or Manitoba maple by the Assiniboine to make sugar. Bossu (1771, 1:188-189) writing of his travels in what was Louisiana in 1756 describes how the Indians "brought me a calabash of the vegetable juice of the maple tree". He goes on to explain that "The French who are settled in the Illinois has learnt (sic) from the Indians how to make this syrup ..." LePage du Pratz in his 'History of the Louisiana or of the Western Parts of Virginia and Carolina' (1774, p.240) describes how maples are tapped in that area. Alexander Henry (1809, p.70) mentions that while he was a captive of the Ojibwa they made sugar during the spring of 1764 in the area south of Michilimackinac. This experience is also acounted in the 'Transactions' of the American Philosophical Society (1793, p.74). He explains that maple "sugar was our principal food during the whole month of April" and that he had "known Indians who live wholly upon the same and become fat" noting (ibid. p.217) that "each man consumed a pound a day, desired no other food and was visibly nourished by it". This suggests that upon occasion the maple industry was a major source of food. Henry (ibid. p.69) explains that, "Bark vessels were placed under the ducts; and as they filled, the liquor was taken out in buckets and conveyed into reservoirs or vats of moose skin, each containing a hundred gallons" which gives some idea of the quantity of sap accumulated. Carver (1778, p.262) travelling in the interior of North America

during 1766-68 confirms this observation stating that the Indians "use it not to render some other food palatable, but generally to eat it by itself". Keating (1824, 1:114) extends the industry to the Kickapoo in more recent times stating that they claim to have been the originators of the sugar industry when they boiled sap in wooden or bark vessels with hot stones (vide. Henshaw 1890, p.345). Penicaut (Thwaites 1902, p.196) explains how, when on the Mississippi in the vicinity of LeSeur's fort, maple and plane trees were tapped and the sap boiled to make syrup and sugar. Verwyst (1895, p.429) claims in 1774 that there were in Wisconsin petroglyphs on the Swamp, or Bad, River left by the Indians in "many maple groves where from time immemorial they have made maple sugar". A French officer who signs himself 'J-C.B.' explains how on the Monongahela near the Ohio in 1755 maples were tapped and how syrup and sugar are made by boiling sap in kettles but makes no suggestion as to its origin (Sulte, 1921). Schultz (1908, p.16) describes the use of ash-leaf maple, or Red River maple, sap being made into sugar at Lac la Biche in 1887 calling it "the maple sugar of the Northwest". Circa 1885-90 the Sioux in Minnesota made sugar from the maple and the yellow birch (Day, pers. comm.).

INDIAN CAPTIVES

Early European captives of the Indians have left acounts of their experiences, some of which include references to the Indians being engaged in the maple industry. These accounts are too late to help establish the origin of maple sugar but, because they have been quoted as early sources in that context they are included here. Nevertheless they do provide some insight into maple techniques used by the Indians.

Steven Williams, an Abenaki captive in 1704, remarks upon the large quantity of sugar made that year (Day, pers. comm.). Swetland (1785, p.19) in an account of his captivity among the Seneca during 1778 and 1779 mentions their having made maple sugar. Findlay (1857, pp.294-296) describes sugaring on the Upper Sandusky River in Ohio as early as 1787. Smith (1799, pp.36-37) who was captured at Fort du Quesne in 1755 by a band including Delaware, Canastaugas (sic.) Ojibwa, Caughnewag (sic.) Mohawk, Wiadotts (sic.), Ottawa, and others, explains that they began to make sugar in February using elm-bark vessels holding approximately two gallons. They carried the sap to the camp in four gallon elm-bark vessels where it was boiled in two brass kettles, each holding approximately 15 gallons, and other smaller kettles. Because they could not always boil sap as fast as it was gathered they stored it in bark vessels which held about 100 gallons each. An account of Smith's experience is contained in Drake's work (1851). Graham (1797, pp.156-157) has recounted that in Vermont "large troughs were made of Pine Tree sufficient to contain a thousand gallons or upwards". Smith (ibid.) explains the common way to eat

sugar was to put it "in bears fat until that fat was almost as sweet as sugar and in this we dipped our roasted venison". Making reference to another year (ibid. pp.68-69) while in an area north of St. Lawrence River in February Smith explains, "We had no large kettles with us this year and they made the frost, in some measure, supply the place of fire, in making sugar. Their large bark vessels for holding stock water, they made broad and shallow; and as the weather is very cold here, it frequently freezes at night in sugar time and the ic' they break and cast out of their vessels. I asked them if they were not throwing away the sugar? They said no; it was the water they were casting away, sugar did not freeze, and that there was scarcely any in the ice. I never did try it but I observed that after several times freezing water that remained in the vessel changed its colour and became brown and very sweet". Rush (1793, p.69) states that by freezing sap "one-half of a given quantity of sap reduced this way is better than one-third of the same quantity reduced by boiling". Drake (1851), Howe (Gay 1755), Hunter (1824, p.29), Tanner (1830), James (1830) and Gibson (Alden, 1837, p.147) are examples of other accounts by European captives which describe the Indian maple industry, none of which bear on its aboriginality.

MAPLES IN EUROPE

Bearing in mind the claims that Europeans introduced the technique of boiling maple sap to make syrup and sugar (e.g., Charlevoix (1744, 5:179-181), Morgan (1851, 1:186, note 1) and Henning (1965, pp.90-93) it is well to note the European experience in this regard.

The oldest references mention the maple as a rarity. Chaucer in the 14th Century mentions the 'mapel-trēow' (sic). It appears as the 'mayple', 'mappel' and 'mapell' in medieval English literature. Gerarde observes (1597, p. 1,300) that "The great maple is a stranger in England, only it groweth in the walkes and places of pleasure of noble men where it especially is planted for the shadowe sake". Googe (1614, p.104) speakes of the 'juyce' and 'sappe' of many trees but does not mention the maple. Evelyn (1670, pp.63-66) describes the maples of Europe and quotes extensively from Pliney but he does not mention sugar made from the maple sap. He gives detailed instructions on how to tap trees, particularly the birch. He explains how birch beer is brewed with malt and raisins and notes the use of birch beer and birch sap for medicinal purposes particularly for dissolving "the stone in the bladder". He mentions Robert Boyle's works on sugar but does not elaborate (ibid, pp.71-77), although he indicates obliquely that he is aware of Boyle's reference to sugar made from tree sap in northern America. In 1684 Mr. Ray, in his response to Dr. Robinson's suggestion that he experiment with maple sugar locally, is able

to state he has had "the greater maple a tree which grows freely half a mile from my residence" tapped and sugar made from the sap (Ray 1789, p.322). 'The Phylosophical Transactions of the Royal Society of London for 1684-85' (Aston, 1686) contains a brief paper probably written by a Mr. Aston the Secretary of the Society, entitled "An Account of the Sort of Sugar made from the Juice of the Maple in Canada". It seems unlikely that this practice would have attracted the attention of the Royal Society had it been common in England, or anywhere else in Europe.

However broadly the maple may have occurred in France Liebault (1588), the the French naturalist, makes no mention of maple sap in his 1588 work on the 'balms and oyles' distilled from trees. Charlevoix (1744, 5:179-181) remarks that "Our maples might possibly have the same virtue had we as much snow in France as there is in Canada, and were it to last as long" makes it seem unlikely that the maple industry was known to Charlevoix in France. Sarrazin (1732, p.65-66) spells out in detail the conditions which must prevail if the sap is to run well in a context which makes it appear that he too is describing to the Academie Royale des Sciences a situation not likely to be experienced in France.

In 1791 after his travels in the United States, Brissot de Warville (1791, 2:65) exclaims "What a revolution would come to pass if the maple could be naturalized throughout all Europe! It has been tried with success by M. Noailles in his garden at St. Germain". Late in the 18th Century many large estate owners in Bohemia became interested in 'Ahorn Zucker', or maple sugar. There are records of 20,000 trees being planted on one estate in 1794 (Nearing 1950, p. 132) and Berlin authorities took "great pains to promote the manufacture of sugar" from plants indigenous in Germany. Some experiments were made for that purpose with the juice of the maple, which was refined in a sugar bakehouse, and found to be equal to loaf sugar .... Attempts are being made at Brandenburg to cultivate this tree and seeds have been ordered from America" (von Lippmann 1929, pp.667-670)." There is a report from Breslau in 1799 that seventeen litres of maple sugar was made from twenty-eight trees and in 1785 trials were made in Sweden to make sugar from sap. In 1800, 30,000 maples were planted and in 1809 there was built in Eisgreb a central boiling facility to serve eight estates which tapped maples. That same year the Prague Patriotic-Economic Society granted 100 guilders for further research in maple products. In 1811 there are records of 49 estates having from 2,000 to 20,000 maple trees (Nearing 1950, pp.132-133). During the British blockade imposed during the Napoleonic wars sugar became scarce. As a result sugar-beet and maple production was encouraged and promoted. Von Lippmann (op. cit), gives detailed accounts of systematic attempts to tap and boil maple sap in Bohemia, Austria, Germany and Sweden. All were abandoned because the mild, short European spring made maple sugar production commercially impossible. The development of a sugar beet with a high sugar content coupled with the drop in

the price of sugar which attended Napoleon's defeat and the raising of the British blockade crippled the budding European maple sugar industry.

Edlin (1949, p.80) remarks that the Norway maple (Acer platanoides L.) "is Europe's original sugar-producing maple and it was tapped in Scandinavia and the Italian Alps long before North American maples were discovered by European settlers". Kalm (Larsen 1939, p.153) states in 1751, "I have been informed that if our Swedish maple is tapped in spring a sugary sap is exuded and it is said to have been made into sugar". Edlin (1949, p.44) remarks that "birch trees were still tapped in the Scottish highlands as late as 1949 when as a rule the sap is boiled down to make sweetmeat". Edlin (pers. comm.) states there is a reference to the Council of Bern having met in 1495 "under a maple providing sugar". He raises the possibility of it having been a sycamore (A. pseudoplatanus.). He also mentions Gilbert White (c. 1730) remarking on the sycamore being used to produce sap for sugar and that is was used for this purpose into the 20th Century when it was replaced by the sugar-beet industry.

In 1918 in an experiment in the USSR Transcaucases region maple trees (Acer trautvetteri Medw., Acer campestre L., A. platanoides, and Acer laetum C.A. Mey) were tapped to make sugar (Vinogradov-Nikitin 1929, p.511).

However common the production of sugar from tree sap may have been in Europe in the 18th and 19th Centuries it seems clear that it was not known when Dr. Ray toured Europe on his botanical expedition during the three-year period 1663-1666.

PART 3 - SUMMARY

Commencing in 1557 with Thevet' account of Cartier's adventures in the Canada region in 1536 and/or 1542 there is a significant body of evidence in the earliest chronicles regarding northeast North America to support the use of tree sap and the manufacture of some maple sugar by the Indians encountered by the Europeans over a large area. Presumably, these accounts reflect generally the situation which prevailed before the arrival of the Europeans.

Clearly the pre-eminent European scholars of the day were not familiar with the phenomenon. The natural philosopher Robert Boyle having published a major essay in 1663, which in part examined in detail the sources of sugar world-wide, heard with incredulity of the practice in New England. Evelyn the botanist too remarked upon it as novel in his work of 1670. When in 1684 the botanist Ray explained in the 'Philosophical Transactions of the Royal Society' that maple sugar had been obtained from Canada which had been made by the Indians there since 'time out of mind', he raised no dissent in the learned Society or among its widespread readers. In the context of these reactions by scholars, particularly botanists who had travelled widely on the continent, it is not reasonable to insist upon a European origin. Neither is it any longer cogent to suggest that the process was discovered by Europeans in the New World who introduced it to the Indians. Thevet's text makes it clear that Cartier was not familiar with the phenomenon when it was brought to his attention by the Indians in the Canada region.

Aboriginality is also strongly supported by the Indians themselves. Numerous ceremonies, rituals and legends, the most important of which can be traced without interruption to the pre-Europe era, incorporate references to the maple tree and the use of its sap and sugar.

There is no evidence that large quantities of maple sugar were manufactured during the earliest periods. However the Europeans had not been on the scene long before the production of sugar increased greatly. Frequently it is evidence from this later era, and colonial times, that is erroneously put forward in polemic regarding the origin of maple sugar.

ACKNOWLEDGEMENTS

I am indebted to many for their varied contributions to this paper. From the outset and on numerous occasions Gordon Day and Michael Foster, Canadian Ethnology Service, National Museum of Man, brought references to my attention, listened to my ideas and problems, and constructively commented on earlier papers. Their assistance is gratefully acknowledged. William Fenton, William Starna, Jack Frisch and Howard Savage invited my attention to references which have enhanced the work.

I am particularly indebted to Tina Matiisen and Jean-Guy Brisson, National Museums of Canada Library, for their assistance. Over the long period this paper was in preparation Tina Matiisen diligently sought out and obtained for me many of the references quoted. Her ability to locate obscure and rare material, often with little bibliographic detail from me, played a major part in making this paper possible. Botanical references were located with the assistance of the Librarian, Canada Department of Agriculture, and the Plant Research Library of the Department. The staff of the Vanier Library, University of Ottawa, were helpful. The text from Thevet's 'Singularitez' was provided by the National Library of Canada, Rare Book Section.

My daughter Elizabeth Ann assisted with the texts in French. Mr. Thomas Ryan, Glebe Collegiate, Ottawa, provided the translation from the Latin. I wish to thank Bea Partridge, Marie Angel, Pat Highley, Roberta Dimitrov and Marguerite Fitzpatrick for their having typed and proofread one or another of the drafts which characterized this paper.

The financial assistance provided by the National Museum of Natural Sciences, which brought this work to a conclusion, is gratefully acknowledged.

Finally I am indebted to the three anonymous referees who read my paper. Their stimulating comments caused me to make revisions which have improved the work.

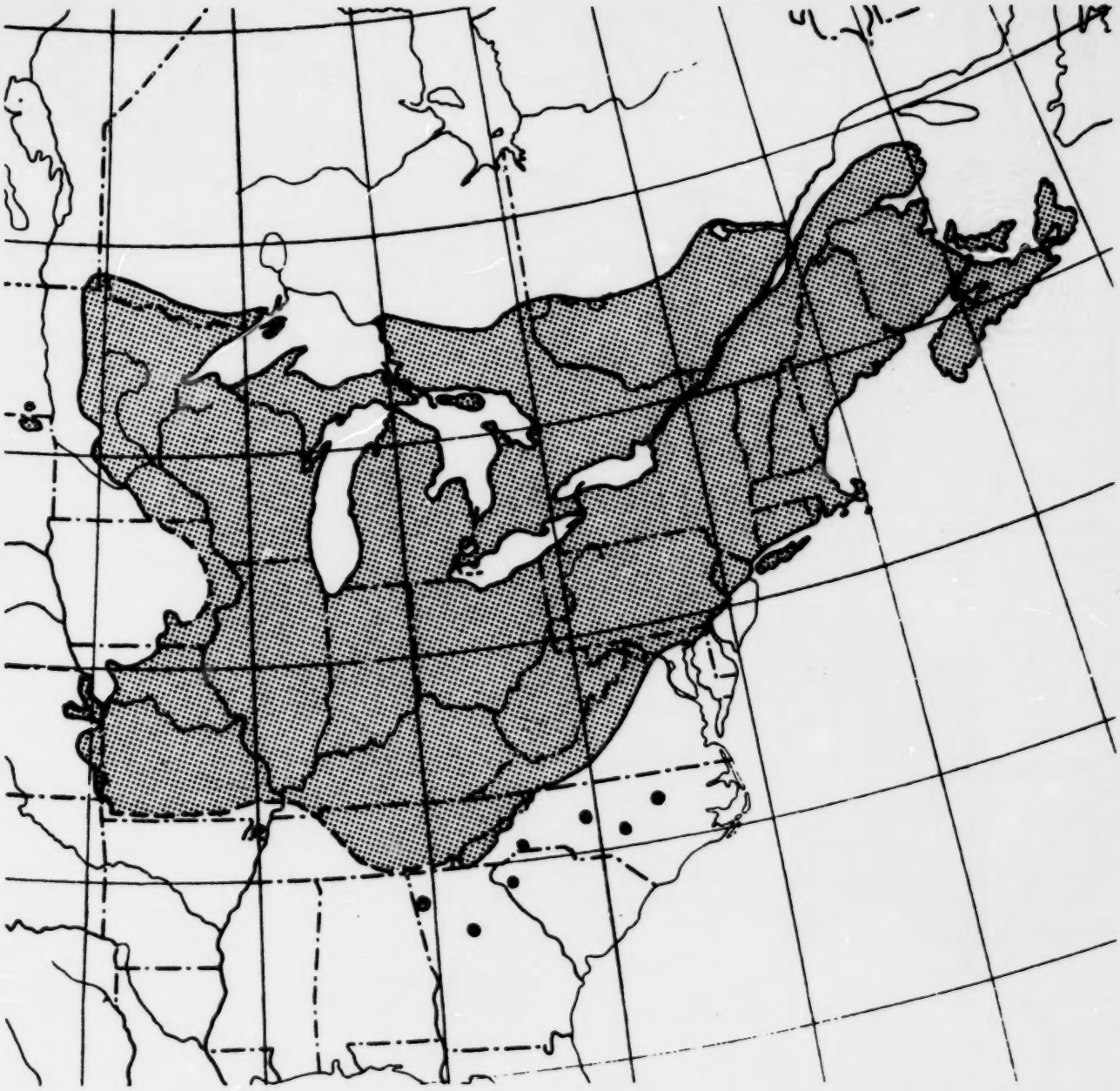

Fig. 1. Distribution of the Sugar Maple (Acer saccharum Marsh). (from: Atlas of United States Trees. 1971. Misc. publ. 1146, U.S. Dept. Agric., vol. 1, plate 99N.)

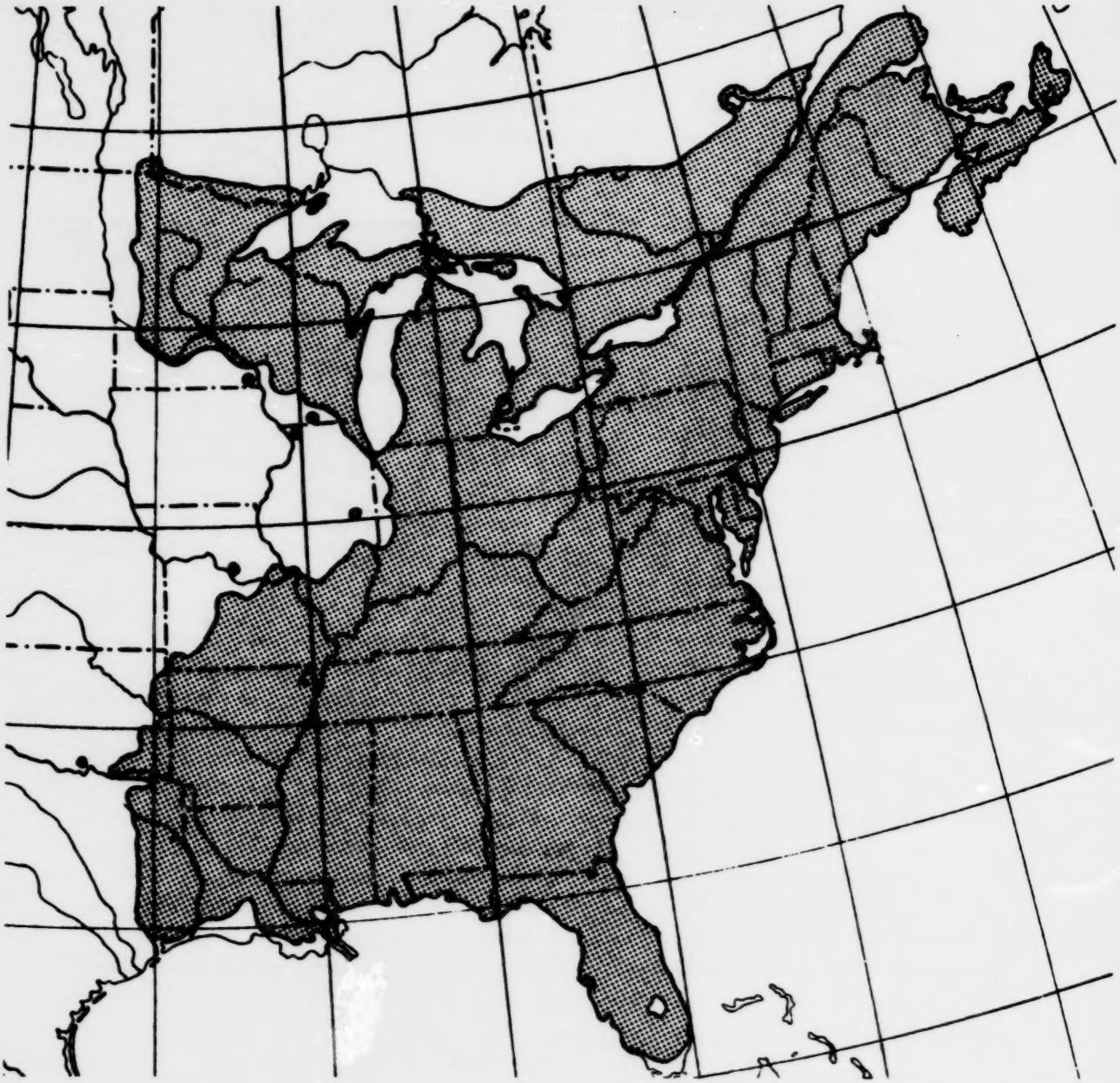

Fig. 2. Distribution of Red Maple (Acer rubrum L.) (from: Atlas of United States Trees. 1971. Misc. publ., 1146, U.S. Dept. Agric., vol. 1, plate 98N.

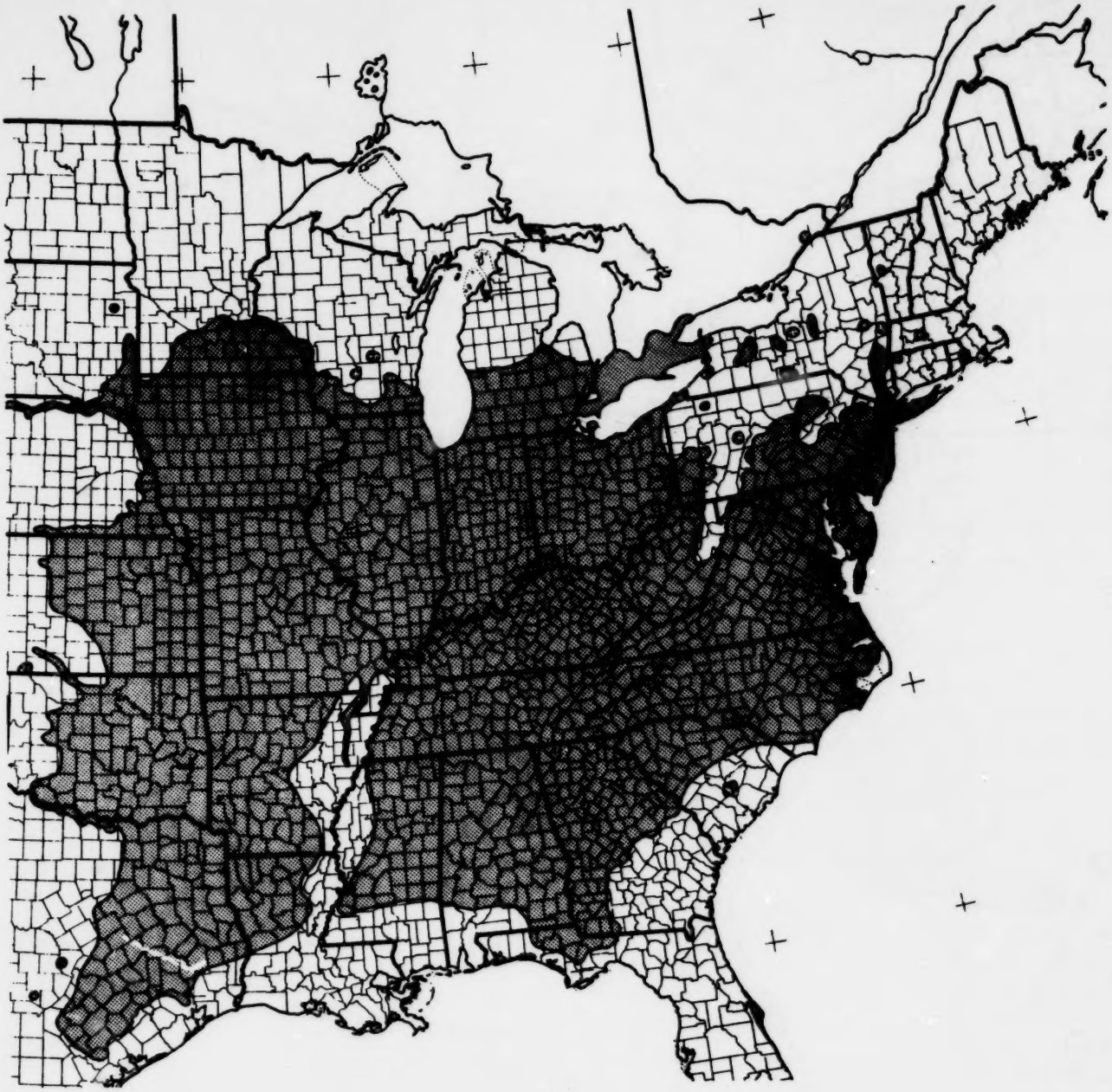

Fig. 3. Distribution of the Black Walnut (Juglans nigra L.) (from: Atlas of United States Trees. 1971. Misc. publ., 1146, U.S. Dept. Agric., vol. 1, plate 134E).

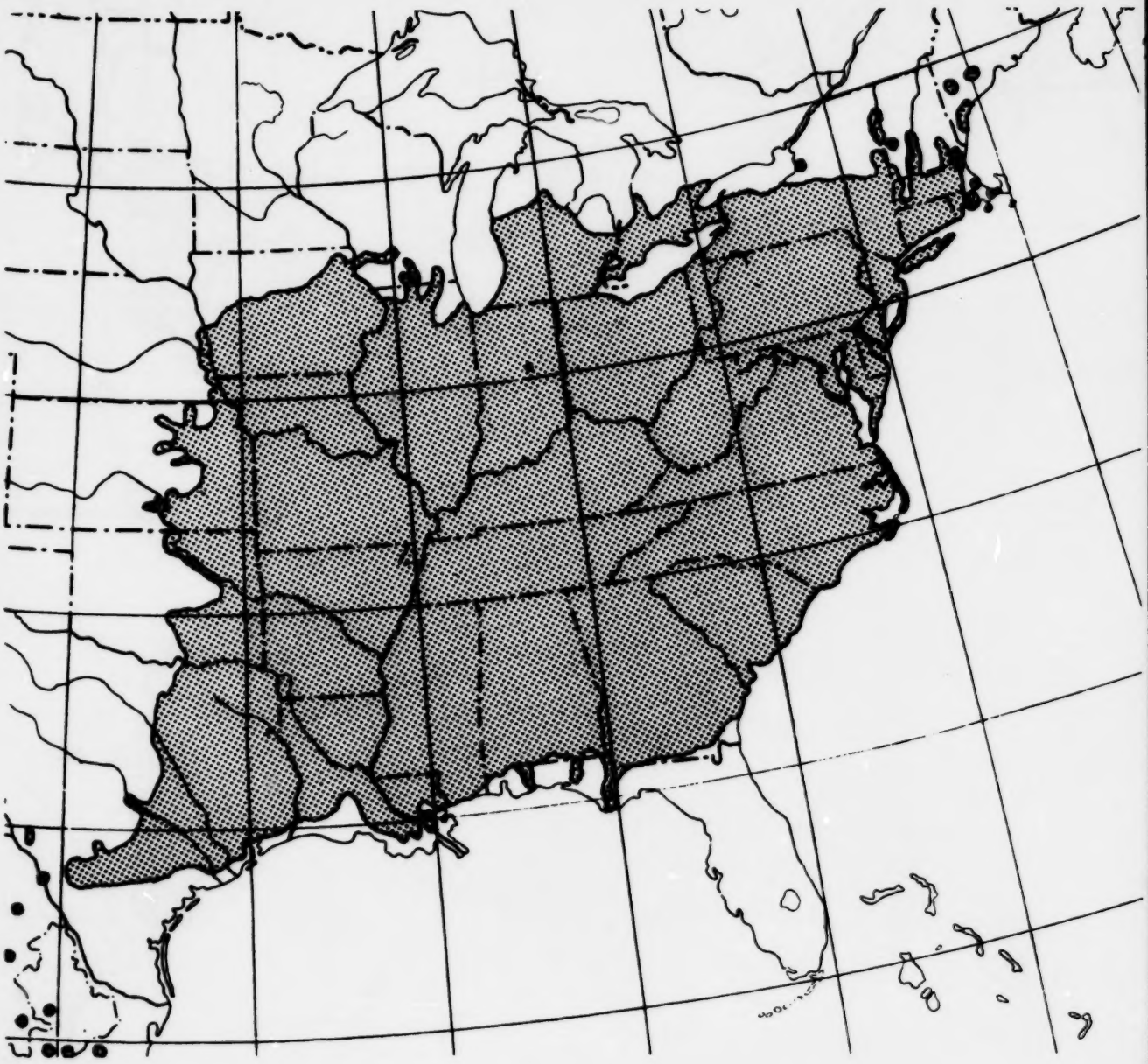

Fig. 4. Distribution of the American Sycamore (Platanus occidentalis L.) (from: Atlas of United States Trees. 1971. Misc. publ., 1146, U.S. Dept. Agric., vol. 1, plate 147N.)

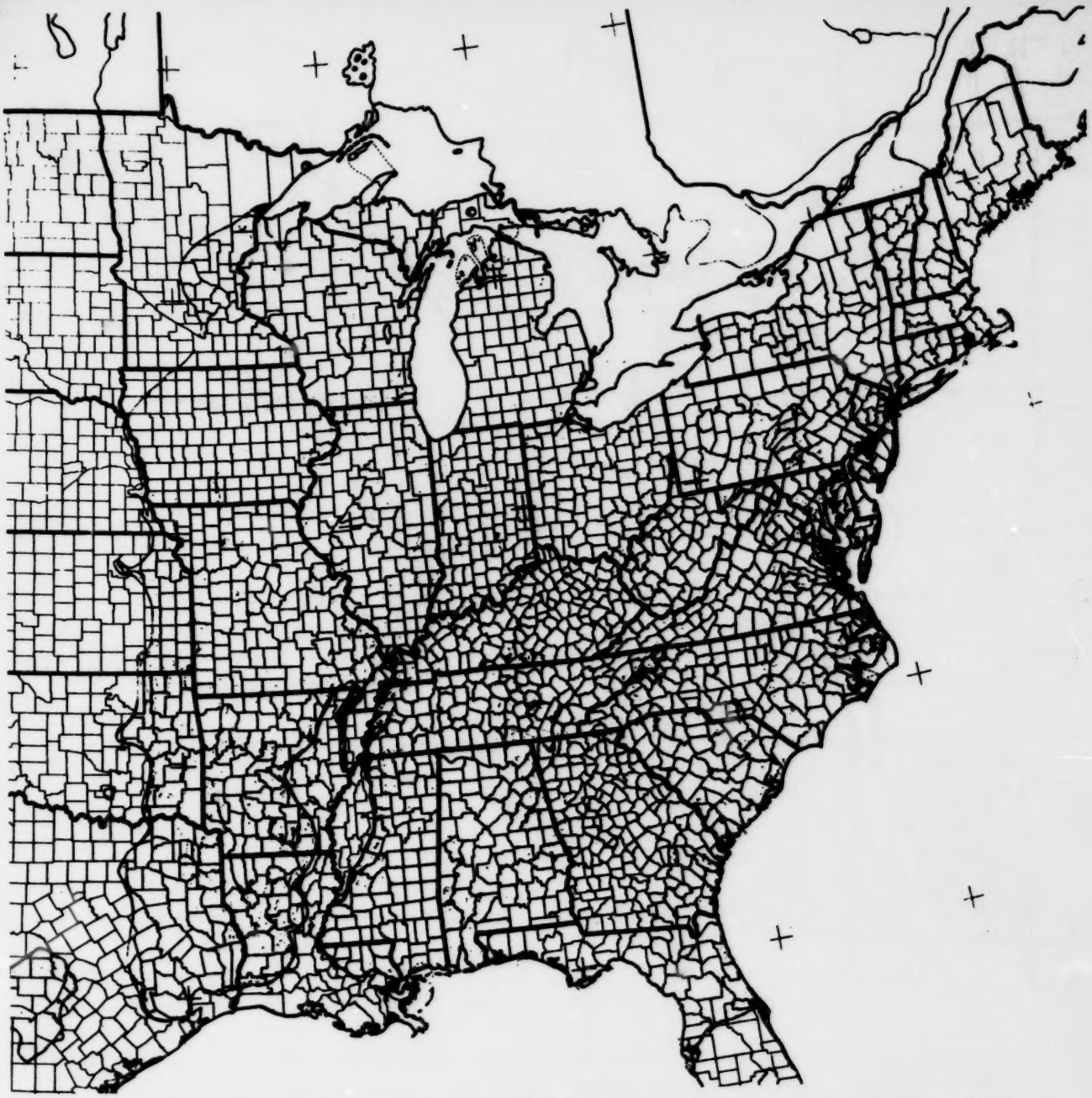

Fig. 5. Distribution of the Black Cherry (Prunus sirotina Ehrh.) (from: Atlas of United States Trees. 1971. Misc. publ., 1146, U.S. Dept. Agric., vol. 1, plate 155E.)

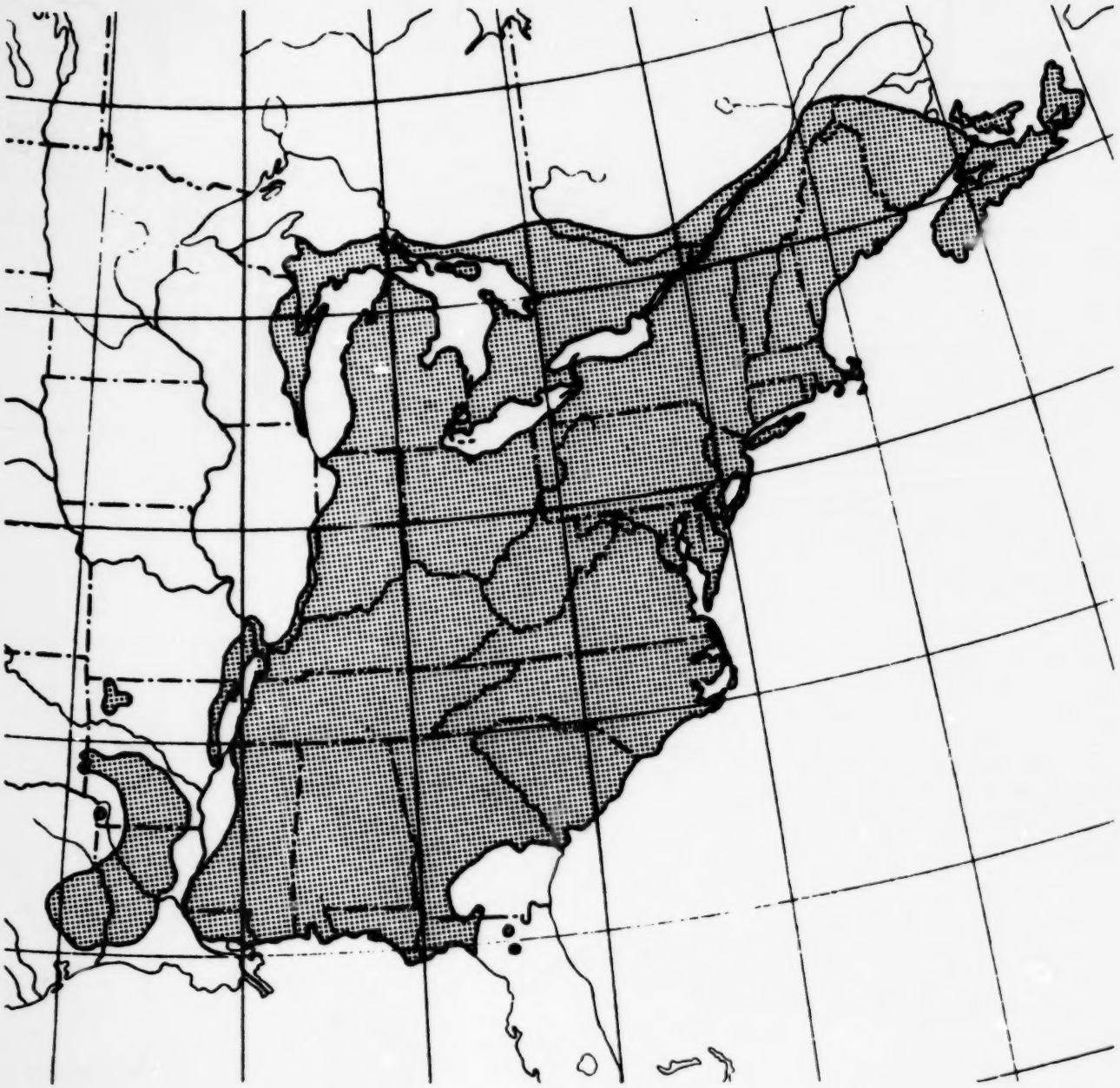

Fig. 6. Distribution of the American Beech (Fagus grandifolia Ehrh.) (from: Atlas of United States Trees. 1971. Misc. publ., 1146, U.S. Dept. Agric., vol. 1, plate 125N)

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